



FRIDAY, MAY 20, 1881.

Presentation of a Workshop by President Morton to the Stevens Institute.

A number of gentlemen interested in mechanical engineering were invited by Prof. Henry Morton, President of the Stevens Institute of Technology in Hoboken, to attend on Saturday evening of last week the formal presentation to the trustees of that institution of a new workshop which that gentleman has recently fitted up and furnished with machine and other tools at his own expense. About forty responded to the invitation, and to all of them the event was a very pleasant surprise.

The building occupied by the workshop is the former lecture room, which is 50 x 80 ft. on the floor, with a high open roof. Galleries have been added running around the four sides.

A Buckeye engine, placed near the centre, drives two lines of shafting, which run along the fronts of the galleries, and from these belts pass off to the counter-shafts of the various machine tools. A spiral stairway gives access to one of the galleries near its centre, where is placed the tool room, in which are systematically arranged all the small tools, such as drills, cutters, taps and dies, mandrills, gauges, etc., which are used with the machine tools. Arrangements are here provided by which these tools are given out to students on presentation of brass checks, exactly as is done in all large shops.

The machine tools on the main floor consist of thirteen engine lathes of different sizes, from one of 23 in. swing and 9 ft. bed downwards, all by different makers, and thus presenting a wide range of variation in style and structure; two planers, with beds 20 in. by 5 ft.; two drill presses; and one universal milling machine. There are, besides, grindstones and emery wheels driven by power, and a large number of vises, work benches, sets of wood working tools, and all other accessories.

It was in this building that the visitors assembled on the above occasion, the space being brilliantly illuminated by the combined effect of electric and gas lights.

The proceedings were opened by President Morton, whose remarks we are compelled to condense. Among other things he said:

Instruction in the special department of mechanical engineering was a new field, and experience alone could show how much practical work could be carried on together with the extended theoretical training which it was and is the chief object of this institution to afford.

Our object always has been and is, to graduate, not journeymen mechanics, but mechanical engineers, and the long list of our graduates now occupying high positions of responsibility in the various machine shops of the country bears abundant witness to our success in the past. For the future we have no idea of allowing our workshop course, in any way, to displace the invaluable instructions of the other departments, but on the contrary, we intend that it shall render them only more efficient, by making closer their relations to what every student sees to be the object of his course here, namely, the acquirement of the various and extensive knowledge, scientific, mathematical and practical, which will enable him to grapple successfully with the vast and difficult problems daily presented to the mechanical engineer.

To master these he must be familiar with the operation of machine and other tools, the processes of molding and forging metals, be able to understand mechanical drawings, and represent his own ideas in the same way. He must have a mastery of mathematical processes for calculating the action of forces, distribution of strains, transformations of energy, have a knowledge of the facts and laws of physics and chemistry, of modern languages, history, literature, and the other elements of social culture, and of the financial relations of his subject, the cost of labor and material, the relative economy of various processes, and the like, as will enable him to choose judiciously in selecting an outfit for any mechanical establishment, and estimate accurately as to its cost.

More than a year ago the special charge of the shops was placed by the trustees in the hands of one of our own graduates, Mr. J. E. Denton, who had distinguished himself not less by his marked capacity than by his zeal for, and devotion to, the interests of his *alma mater*. Under his energetic and unrelenting efforts, the workshop course was so developed that the accommodation which, year by year, had been becoming more straitened, was felt to be already, or sure to become in the near future, manifestly inadequate.

Under these conditions, various plans were discussed, by which some provision might be made to afford such workshop accommodation as seemed to be required.

While considering these, the idea came to my mind that I might myself fit up such a shop as was needed and present it to the Institute. Such an enterprise was rendered feasible by the possible use of the large building originally designed as a lecture hall, and which, during the early years of the Institute, was eminently useful in that capacity, and which has since been fitted up as a gymnasium. This plan being approved by the trustees, and the large cost of a new building being thus avoided, I have been able, at the moderate outlay of about \$10,000, to carry out my plan, which expenditure is represented by the memorandum and vouchers herewith.

Allow me also to present to you at this time, on behalf of the American Steam Gauge Company, who have generously donated it, the beautiful "indicator" which you see attached to the steam engine.

Finally let me take this occasion to express my high appreciation of the unvarying and kind sympathy with which I have always been sustained and encouraged by yourself and the other members of the Board of Trustees, and my conviction that whatever has been or may be accomplished in this Institution, will be primarily due to your large minded and judicious management.

To the above address the Rev. S. B. Dod, President of the Board of Trustees, replied as follows:

ADDRESS OF REV. S. B. DOD.

It becomes my pleasant duty, on behalf of the trustees, to accept the generous gift of the President of our Institute, which does honor alike to his intelligent appreciation of the wants of the students, and his hearty interest in their welfare.

To the thoughtful interest which he has manifested from the very beginning, the Stevens Institute owes its success. He has been ably seconded by a corps of professors heartily in sympathy with his plans, and thoroughly conscientious in maintaining each his own department fully abreast of the times.

The best evidence of the success of an institution of learn-

ing is in the kind of young men which it turns out, to take their place in the great world.

Our graduates have borne splendid testimony to the men who have trained their minds and their hands to work. Wherever they have gone, they have made their mark.

We accept, therefore, this gift from President Morton, with our heartfelt thanks for the generous spirit that prompted the giver, with the hope and belief that it will realize for the young men who study here all the benefits that he hopes to realize, and with the assurance that we see in this only another evidence of his hearty devotion to the welfare of the Stevens Institute, to which he has ever given that which is worth more than all else, the earnest, thoughtful, intelligent purpose to make this Institute a success.

Next followed an address by Mr. Coleman Sellers, of Philadelphia, who spoke as follows:

ADDRESS OF COLEMAN SELLERS, M. E.

A good many years ago (how many I do not like to say) it was my good fortune to make the acquaintance of a young man in Philadelphia, who, at that time fresh from college, was engaged in teaching in one of the schools. He showed great aptness in grasping knowledge, and could, with remarkable cleverness, make others the recipients of what he knew. Besides being skilled in the use of his pencil, he was a good workman in metal and in wood, and I came to know him through his making some of the pieces of apparatus he needed in his teaching. From him I found that I could obtain much that was of use to me, and he, in turn, asked my advice in mechanical matters; so in a short time there grew up a warm friendship, fostered by kindred tastes.

When the Franklin Institute of the State of Pennsylvania came to select a permanent Secretary, who should be, as it were, the scientific head of that institution, it was so fortunate as to secure the services of this young man, who, in an admirable manner, carried out the plans inaugurated at the creation of this office. Brilliant lectures to crowded audiences drew attention to the Institute and its work, and added to the fame of the lecturer. Soon he was made editor of the *Journal of the Institute*; then he was granted leave to fill, for a time, one of the most important chairs in the University of Pennsylvania.

The trustees of the Stevens bequest saw in him a means of judiciously utilizing the money they had to expend, and thus my friend, Prof. Henry Morton, came to be made the President of the Stevens Institute of Technology. He has always looked upon this scheme of educating mechanics as one that must be tried in such a way as to make each step in the process of experimentation a step in advance. He tells you what he has had in view, and he calls on me to say what I think of the plan—a plan to carry out which he himself has, with commendable liberality, furnished the wherewithal.

A few years ago the impression obtained among teachers that education must be directed to the training of the mind only, and but little effort was made to make the hands take any part in the system save in the one thing of using the right hand as the guiding member in writing. The common schools and the colleges, too, turned out boys ready to barter, or may be to become members of some of the learned professions as they are called, say doctors of medicine, lawyers, preachers, and the like, but not to be mechanics, and I dare say the idea of a machinist requiring a more extended general knowledge than the doctors seldom entered the heads of those who should have given thought to the subject. To become a good journeyman machinist requires that there shall have been a thorough training in the art, and constant practice. His skill comes from application, and may be separate from any great amount of mental training. That is to say, the minimum amount of book learning may serve the purpose of any one who aims to become a skilled artisan only so far as his hand training is concerned. To be a mechanical engineer is a very different matter indeed. A learned professor, once speaking of a certain mechanical engineer, and intending to compliment him, said that he believed him to be a distinguished *amateur* physicist. Now it seemed an odd thing to call that man an amateur whose whole success in his profession came from his thorough knowledge of the laws of physics, whose every day tools were those laws—who, to do what he had to do in his every day work, must have at his very finger ends, as it were, all the learning of many very learned professors, and if he cannot keep all this vast amount of knowledge in constant working order, he must at least have such an acquaintance with books and their contents as will enable him to go at once to the fountains from which he must draw his supply of knowledge.

The mechanical engineer who has grown up through the shops, only without any preliminary training in the schools, has a very hard road to travel; hence, many who rank high in the profession wear themselves out in the effort to educate themselves up to the requirements of the times.

When the idea first dawned on our educators that some effort must be made to teach those who would be machinists, inasmuch as there was but little chance for all who wanted to learn to get into the shops; the problem seemed easy enough of solution. We had but to add the required shops to our schools, and the thing would be done.

Adding shop practice to the regular school course *did not do it*, and for the very simple reason that no one can make a skilled mechanic, in the sense that one is so rated in the shops, in so short time as say 1,000 or 2,000 hours, and that is about all the time that can be spared from a three years' course in a general college education. The shop, too, was shown to be a very expensive adjunct to the school; if it does not produce salable material, it expends large sums of money in the process of teaching. School shops then began to compete with the other workshops of the land as producers, but it took a very little time to convince those who first tried the experiment that raw boys cannot be made to do work that will sell in competition with the work of the well-organized and well-equipped manufacturing establishments of the land. So now one can find, without searching very far, some such shops idle.

After many failures of this kind, there came a new system into vogue that has been called the Russian system, most excellent in its way, by means of which skilled workmen are trained in a shorter time than by any method with which I am familiar, but which, of itself, will not do all that is wanted.

The Russian system seeks to instruct without trying to construct. That is to say, by a well selected series of manual exercises, the hand or the pupil is trained to do certain work, while he is not hampered by the fear of loss of material worked on; this scheme of training permits a graded marking as to proficiency, which is as readily applied as in any other school exercise. We may accept the Russian system as a step a long way in advance in the training of skilled artisans, and it is likely that the introduction of that system into our workshops, and the seeming loss of the apprentices' time during the period of instruction, may, in the end, be found to be more than compensated by the superior skill developed by systematic training, in comparison with the process of learning as best he can, now in vogue in shop training. But the young man who aims to be a master mechanic needs much more than he can get in the workshop or in the school; and to acquire all that is needed, he wants time in the drawing room, in the shops and in the office. The latter plays an important part in the shop economy. Let a

man be ever so good a mechanic, if he be not also a merchant he is lacking in what makes the difference between success and failure. The great question involved in all engineering work is, "Will it pay?" To make a machine work is one thing; to make it work without costing too much, is quite another matter. Here is where I look for the great results from this effort of the Stevens Institute to still further develop its capabilities in the direction of training mechanical engineers. As I understand the intention of President Morton in the use of this shop as a means of education, it is to have the money or cost element fully developed, and in this I think it will make a long step in advance. I have carefully considered all the problems involved in this scheme of teaching, and cannot but predict the happiest results.

Some very happy remarks were also made by Mr. Horatio Allen, now one of the veteran engineers of the country, and Mr. Rossiter W. Raymond, whose graceful sentences always seem to convert the practical art of the engineer into poetry.

The event was completed by a very pleasant reception at President Morton's house.

An Illinois Railroad Commission on the Effect of Railroad Pools.

The following letter from Mr. George M. Bogue, one of the Illinois Railroad Commissioners, appeared in the *Chicago Tribune* of May 13:

Several weeks since, three gentlemen, signing themselves "The Anti-Monopoly League of Chicago," issued an address through your columns "To the Railway and Warehouse Commissioners of the State of Illinois," of which Board I have the honor of being a member. I read the remarkable document at the time with somewhat of amusement and did not think it deserving of a reply, but several of my friends insist upon its being answered, and, without consulting my associates, I will assume to make such a reply as my limited time will permit of.

The language used in the address discloses its real author, and it is no other than the same individual who preferred charges against two of the present commissioners before the Senate Committee on Railroads, which charges were carefully investigated by said committee, covering several weeks, during which time a large amount of testimony was taken, and the committee, by a decided majority, held against the complainant and in favor of the commissioners; this fact fully explains the indecent attack in the address upon said committee.

That part of the address so full of interrogatories as to the "law," "McWilliams bill," "advice of counsel," etc., etc., is so supremely impudent that I will not attempt any reply.

As to the "solemn promises of activity" made by a majority of the Board to secure confirmation, I can only say that the charge is absolutely false.

It is to be feared, however, that the cause these gentlemen appear to have at heart will not be benefited by the methods they adopt. Such reckless statements, with such irrational conclusions, do not carry conviction, and this, coupled with the fact that the business men who are being so terribly plundered are apparently ignorant of the slavery in which they exist, tends to weaken the force of this already weak appeal to the mind of the thoughtful student of political economy.

Whatever evils the railroads may justly be charged with, such documents as this will do no good. The address bristles with terrible words, but it is woefully deficient in logic and in facts; in fact, it is "full of sound and fury signifying nothing," and would be unworthy of answer, save that the transportation question is beginning to attract attention, and some innocent seeker after justice, not familiar with the subject, might possibly think that some of the statements contained in this remarkable effort were true.

The figures of the League are most remarkable; they quote no less an authority than Secretary Windom for the statement that "the burdens unjustly imposed on our commerce every year by the east-bound pool alone" amount to more than \$200,000,000.

The facts are that in 1880 all the roads in the United States earned in gross \$530,000,000, and the net earnings above operating expenses were but \$220,000,000. The length of roads in actual operation was 85,000 miles; consequently the amount of net earnings represent but 7 per cent. on a cost of \$35,000 per mile. Granting that some of our roads have not cost quite as much as this, it is probable that, taking the general average throughout the country, the actual cost has been considerably above \$35,000 per mile. There would seem to be no reason for discrediting the statement of Mr. Fink that the entire amount involved in the east-bound pool is but about \$60,000,000 yearly, but whether this statement approaches accuracy or not, Mr. Secretary Windom and the "Anti-Monopoly League of Chicago" will hardly be able to substantiate their figures until they can prove that a part is greater than the whole, or in other words that \$200,000,000 can be "unjustly extorted" out of the business comprising the various pools, since the total earnings on it is "pooled" business must be far less than half this sum. The Anti-Monopoly League states in its "address" that by reason of the pools the rates have been advanced from 15 to 300 per cent., and cites as an example the fact that in 1876 the rate on grain, Chicago to New York, was 12 cents per hundred, while it has since been raised to 30 and 35 cents, and that during the Hepburn investigation at Albany it was proven by experts that a large profit could be made on a rate of 20 cents. I have been unable to find any such statement by experts or others before the Hepburn Committee. Mr. Fink did say that *possibly* there was a profit in such business, meaning thereby, as he has since stated, that, having a road fully equipped, it might be better for a manager to take grain at such rates than not to take it at all, but he was very far from saying that such a rate would pay a fair return to the owners of the property on its cost; it might pay a slight margin of profit over actual cost of handling, but even this is doubted by many experts.

It would not seem that the true interests of the people of Illinois require the railroads to impoverish themselves by carrying grain at 12 cents from Chicago to New York, and it appears to me that a fair and reasonable rate alike, in all cases and to all parties, is far more desirable than the irregularities of past years, when discriminations of the worst character as between individuals were likely to occur, and in fact were practiced.

As to the question of inter-state commerce, the roads in Illinois interested in the so-called "trunk-line pool" have but a very limited mileage within the state, and, moreover, there are serious doubts whether the Board of Railroad and Warehouse Commissioners have any jurisdiction whatever over the question; indeed, the Senate Committee on Railroads, when investigating the charges preferred against the Commissioners, ruled out all questions affecting inter-state commerce, holding that that was a question with which the Commissioners had nothing to do.

Nothing, seems to me, is clearer than the fact that railroad rates are both in winter and summer kept within reasonable bounds by water competition; nor is any combination of water-carriers, whereby the whole carrying trade shall be

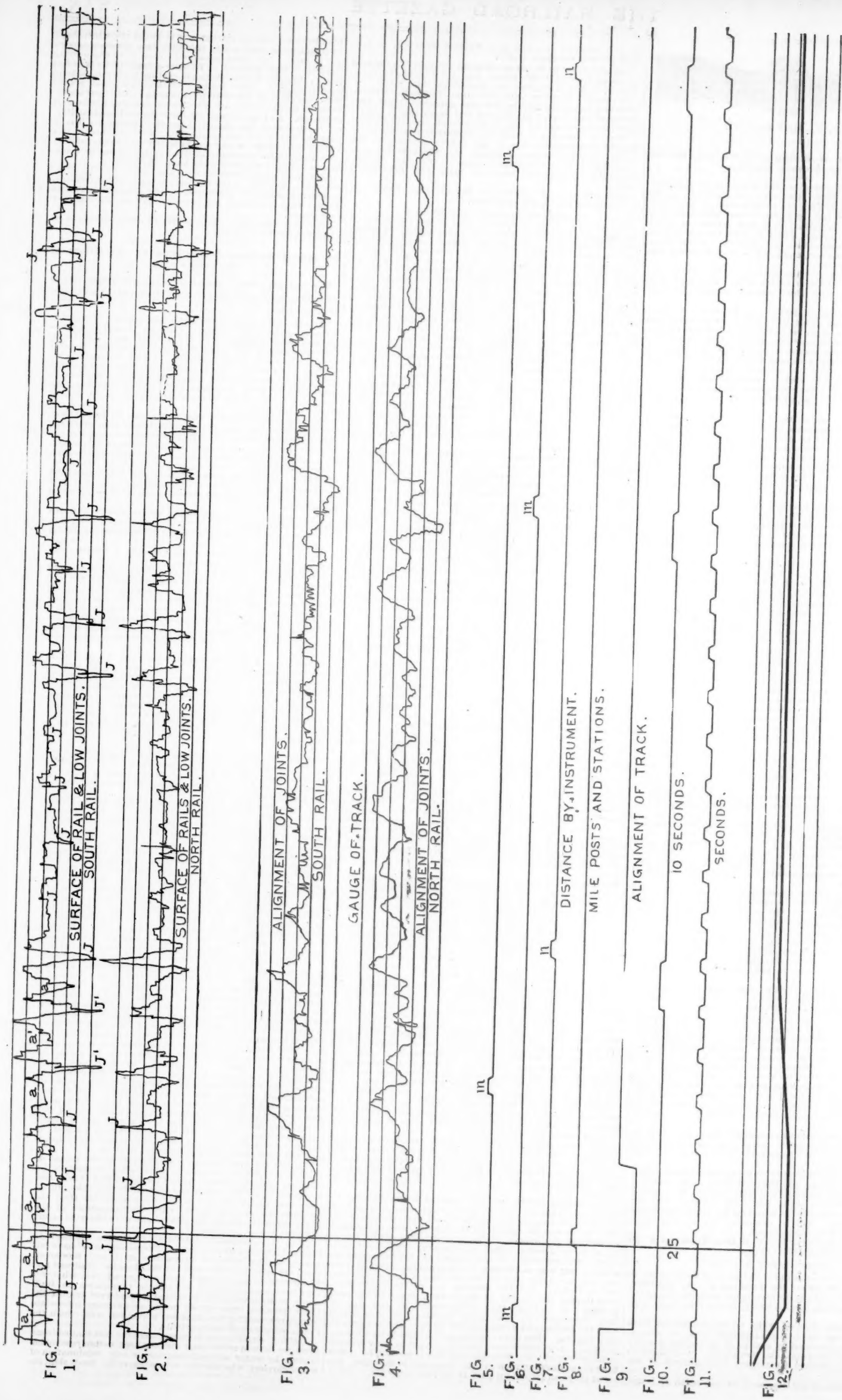


FIG. 13. DIAGRAMS TAKEN WITH DUDLEY'S DYNAGRAPH, SHOWING THE CONDITION OF A RAILROAD TRACK.

come a monopoly, at all probable or feasible. Grain will not be shipped in winter if the rates are such as to make it profitable to the owner to store it until the opening of navigation—a fact well attested by the replete condition of the Chicago elevators during the winters of 1879-80 and 1880-81.

Since the three gentlemen of the Anti-Monopoly League think so highly of Secretary Windom, why do they not quote him on this point also. In his speech in the Senate June 10, 1878, he remarks, speaking of the Mississippi River, and the great Lakes, and the Erie Canal: "It will be as impossible for the railroads to combine and put up prices as to effect a combination of interests between Chicago and St. Louis, or New York and New Orleans. The interests of the lines themselves are necessarily antagonistic, and as each will be an open, free highway to everybody who chooses to float a vessel upon its waters, combination will be impossible and competition the inevitable law of their existence;" and further on Mr. Windom remarks that this competition between water and rail will necessarily be felt everywhere and will regulate the charges on every railroad from the interior to the seaboard.

The three gentlemen of the Anti-Monopoly League call attention to the abuses caused by the pools formed by the railroad companies in this state, but they do not state what these abuses are. They simply say that by these pools the rates have been in many cases advanced from 15 to 300 per cent. This statement is so ridiculously preposterous that it is unworthy of notice. Think of a railroad company advancing its rate 300 per cent. at a junction point, where it is so difficult to maintain any rate at all on account of the fierce competition prevailing.

Pools in this state—i. e., on business carried from one point to another in the state—are mostly at small stations, and the result cannot be justly held to be detrimental to the state at large. The effect is to give the junction points less prominence, and to give the towns which are not fortunate enough to have two or more railroads a fair chance to compete for the trade of the country surrounding them. These pools also tend to insure the selling and handling of a fair proportion of the grain and stock within the state, instead of allowing it all to be drawn to markets in other states by roads having but a very small mileage in Illinois. The opinion of Attorney-General Edsall is to the effect that the pools are illegal only when the rates charged are extortionate. In other words, that extortion is illegal, but pooling is not necessarily so.

In nearly every case where pools are known to exist the rates charged are not higher than the Commissioners' schedule, and it is doubtful whether action by the Board looking to the abolishment of these pools would have any effect on the rates. Pooling is simply a means used by the railroads to protect themselves against each other.

Mr. Fink, speaking of "pooling," says the object is "the maintenance of permanent and uniform transportation rates, and is simply an agreement between the railroads to deal fairly and openly with each other and with the shippers." I do not in the least understand it as a combination of the railroads against the public.

Competition has in many cases reduced railroad rates to a point far below the actual cost of the service performed (as witness the 12-cent rate from Chicago to New York), and the result of such competition in any business is combination or failure. The latter is certainly not desirable, and the former is not contrary to public policy, if it does not result in extortion. It was shown conclusively in the investigation before the Hepburn Committee, that the rates on our American railroads were lower than anywhere else in the world, and while there undoubtedly are cases where extortion is practiced, and while it cannot be claimed that our system is perfect, it is still true that the inexorable laws of trade have steadily reduced the rates of transportation, and will continue so to do, in spite of any effort of the railroads, by combination or otherwise, to stem the current. Coupled with this reduction, however, various hitherto unknown or unrecognized economies will doubtless be introduced, so as to permit of reduction in rates without financial disaster.

The "Anti Monopoly League of Chicago" is pleased to remark that it was apparent during the recent investigation of the acts of a majority of the Board of Commissioners, before a committee of the Senate, that the railroads used all their influence to secure the confirmation of that majority, meaning Commissioner Smith and myself. I will simply say in reply that the railroads were virtually made co-defendants in the investigation, which was brought about by charges made by an individual who had had no prior dealings with the Board, but who claimed to have grievances against certain roads. No railroad officers were called by the Commissioners in their defense, and such as did appear were summoned by the individual mentioned. I have no means of knowing to what extent the railroads were interested in our confirmation, but the fact that they (the railroads) were represented in the affair at all was due to the complainant and not to the Commissioners.

Track Inspection with Dudley's Dyngraph.

In the *Railroad Gazette* of Sept. 19, 1879, an engraving and description were published of Mr. P. H. Dudley's "dyngraph." Since that appeared he has been employed by various railroad companies to inspect their tracks, of which his instrument gives a graphical diagram. We give herewith a specimen of such a diagram, taken from a recent inspection. Figs. 1 and 2 show the condition of the surface of the rails. The straight horizontal lines are drawn by an ordinary ruling apparatus, and are intended simply to show the relative rise and fall of the irregular line, which represents the actual vertical inequalities in the track. This line is drawn by a pen attached to the journal-boxes of the middle pair of wheels of a six-wheeled truck under the car which carries the instrument. The vertical scale is full size and the horizontal scale is 1 in.=50 ft. In fig. 1 the depressions of the rail are represented by the lines going down, and in fig. 2 the reverse way, or by the lines going up. In these diagrams the positions of the rail-joints are indicated by J, J, J. It will be seen that in some cases the joints in the track, represented by the diagram, were nearly an inch lower than the highest part of the rails, and about a half inch lower than the middle of the rails. The best tracks so far inspected have depressions in the rails and at the joints of from $\frac{1}{8}$ to $\frac{1}{4}$ in., and on the poorest tracks they are from 1 to $\frac{1}{2}$ in. In fig. 1 the depressions indicated by a, a, a, represent a common form of permanent set in steel rails on roads having a heavy traffic, and on which the surface of the track is not carefully maintained. This set is more marked at a, perhaps than at any other part of the diagram. It will

be seen that the joints are a half inch lower than the middle of the rail, and the latter at a distance of about one-fifth of its length from the end is $\frac{1}{8}$ in. higher than the middle. The form of the rail is therefore somewhat as indicated by the line fig. 13, in which the vertical scale is $\frac{1}{8}$ in. = 1 in. and the horizontal scale 5 ft. = 1 in. Indications of this form of permanent set of the rails may be discerned all through the diagram.

Figs. 3 and 4 show the horizontal alignment of the heads of the rails and their distance apart, or the gauge of the track. If the frogs and switches are not in line the amount they are out is also shown by this diagram.

Figs. 5 and 6 show, by means of an integrating apparatus, the sum of the vertical inequalities of the track indicated by the lines in figs. 1 and 2, the marks or offsets m in the lines indicating a foot of vertical inequalities in the rails. The horizontal scale of the diagram, being 1 in.=50 ft.; the frequency or infrequency of these marks gives a measure of the condition of the surface of the rails. Thus in fig. 5 these marks are $9\frac{1}{4}$ in. apart, indicating that in $9\frac{1}{4} \times 50 = 462\frac{1}{2}$ ft. of track the sum of the vertical inequalities was 1 foot.

Fig. 7 records the distance run over by the car and instrument, each $\frac{1}{2}$ of a mile being indicated by a mark n n.

Fig. 8 gives a record of the position of the mile posts.

Fig. 9 shows the alignment of the track.

Fig. 10 gives the distance run each 10 seconds, and fig. 11 the distance run per second.

Fig. 12 shows the elevation of the rails on curves. This record is made by means of two cylinders, one on each side of the truck, connected together by a tube, and filled with water. A hollow ball or float is placed in each cylinder, which make a record as shown in the figure.

It will be seen that the instrument is intended to give a graphical diagram representing the actual condition of the whole of the track which is inspected by its use. Mr. Dudley has been engaged by the managers of the New York Central Railroad to inspect the whole of their track from New York to Buffalo, and as we write is engaged on this work.

Contributions.

Formula for Connecting Curve.

STUEBENVILLE, O., May 15, 1881.

TO THE EDITOR OF THE RAILROAD GAZETTE:

Some time ago I noticed a mistake in the article on railroad alignment, published Dec. 3, 1880, for which I am responsible. The term in the formula for length of tangent which reads $x \tan \frac{1}{2} I$ should be $x \tan \frac{1}{2} I$. If you will correct this you will greatly oblige.

E. H.

The Switchman's Perils.

TO THE EDITOR OF THE RAILROAD GAZETTE:

We become so soon hardened to the misfortunes of men in the mass, it is wise to keep before the mind the individual and dramatic accidents to which our poor brother, the switchman, is falling a victim.

Two new men, one as new as the day, began their untaught, dangerous task this morning, and before night ended it forever. One was killed by the crush of two cars; the other rested his hand against the buffer-block while preparing to couple, and, of course, lost it.

Ought not these dumb, stupid new hands, if they cannot get a few days of training, at least to get some very definite and repeated warnings as to common forms and positions of danger?

X. Y. Z.

CHICAGO, May 13, 1881.

The Invention of the Fish-Plate.

WALFORD MANOR, SHREWSBURY, England,
May 2, 1881.

TO THE EDITOR OF THE RAILROAD GAZETTE:

Mr. F. A. Browne asks the date of Mr. W. Brydges Adams' patent for fish-joints.

Unfortunately, at the present moment, I am unable to refer to my late father's papers, but from recollection it would be about 1846, and anterior to Mr. Browne's experiments.

Mr. R. L. Stevens was much earlier than Mr. Adams, but there can be but little doubt that the idea was original to Mr. Adams, and that he was the first to patent and introduce into practical operation in England, from where it spread to America and the Continent of Europe.

W. A. ADAMS.

[Doubtless it is true, as Mr. Adams says, that the idea of fish-plates was original with his father, and that he was the first "to introduce fish-plates into practical use in England," but the remark that the idea of the father "spread" from that country to America, where, it has been shown, it had been in use long before, implies a rather singular attitude of mind for the son to assume in a discussion of the priority of the invention. It is as though the Germans should say that the art of printing "spread" from their country into China.]

In this connection we would call attention to an error in printing the name of the correspondent who, in our last week's issue, testified as to the general use of fish-plates on the Camden & Amboy Railroad prior to 1846. It is J. Keene, not Reeve. The Camden & Amboy, as Mr. Adams may not know, was then the best-known railroad in America, uniting New York and Philadelphia, and its practice must have been very generally known to American railroad engineers.—EDITOR RAILROAD GAZETTE.]

Library of the American Society of Civil Engineers.

The following circular, dated May 5, has been issued to the members by the Committee on Library of the above society, who are Messrs. J. J. R. Croes, O. Chanute and Ashbel Welch:

The Committee on Library desire to call your attention to the Index to the Railroad Section of the Library, a copy of which has been sent you by mail.

The object of the index is threefold:

First. To inform members of the Society of the contents of the Library, which has attained very respectable proportions and holds much that is valuable.

Second. To attract attention to the deficiencies in the sets of reports and documents relating to corporations, and induce members to send copies of the documents needed to make those sets complete and to make the Library what it should be, a full and complete collection of printed matter relating to American railroads.

Third. To aid members in the investigation of special subjects by furnishing them with a topical index of the current literature of these subjects.

The present issue will serve the two first named purposes, and to a certain extent the third. What is now presented in the third division of the Index, viz.: "Subjects," will, it is hoped, be of assistance in enabling members to know exactly where to look for information on many points. To be thoroughly useful, this division must be extended to include the periodical literature named on pages 187 and 188 of the Index. To accomplish this, the co-operation of all the members is desired. What has been accomplished has been put into its present form by the Chairman of the Library Committee, with the aid of a few members working on the basis of the arrangement and card-cataloguing of the Library, which has been thoroughly kept up by the Secretary in addition to his other duties, occupying his time to such an extent that it was impossible for him to carry out the full scheme of making the Library useful to all without further assistance. Your aid is earnestly requested in the extension of this work, in the direction and manner in which it has been begun.

The Committee will be glad to receive from you answers to the following questions:

(1.) Will you contribute to the Library any reports or books relating to railroads?

(2.) Will you prepare a topical Index of any volume or volumes you may possess of foreign or American periodicals other than those named on page 3? Or, if a resident member, will you undertake—whenever you can spare the time—the preparation at the Society Library of a topical Index of one or more volumes of periodical literature?

If you will do this, cards and a letter of general advice as to scope and style of the indexing will be furnished.

Such an Index as is proposed cannot but be invaluable to all members, by enabling them to find precisely what they want if they visit the Library, or to send for the information definitely if they are at a distance.

It is proposed to issue another edition of the Index if this appeal is responded to as fully as is anticipated.

Address replies to John Bogart, Secretary and Librarian. The circular below has been prepared for and already sent to many railroad officers:

DEAR SIR: I beg to call your attention to the Index to the Railroad Section of the Library of the American Society of Civil Engineers, a copy of which is sent to you by mail to-day.

The Library, as you will observe, possesses now more or less complete sets of reports and documents of more than 400 railroad corporations, in addition to other works and monographs relating to railroads. Many of these are rare and valuable.

It is very desirable that this Library should be a perfect and complete collection of all that has been published in relation to American railroads. The Committee on Library request your co-operation in making it such, and will be greatly indebted to you if you will kindly send to the Library such reports and documents relating to your own or other railroads as you may be able to contribute, and which are not already in the Library.

The Purchase of the Atlantic, Mississippi & Ohio.

A correspondent of the *New York Herald*, writing from Philadelphia May 11, gives the following as the story of the purchase of the Atlantic, Mississippi & Ohio Railroad, told him during an excursion over the road by the directors of the new Norfolk & Western Company:

On a raw morning of last February (the 9th) the sale of a railroad, known as the Atlantic, Mississippi & Ohio, occurred at Richmond, Va. It had been in the hands of two receivers for several years, and these men, taking advantage of the low price of steel rails, carefully expended all the earnings of the road in new plant. More than two hundred out of the 408 miles of track were relaid in the best manner, quietly and thoroughly. All the important bridges were rebuilt with the best wrought iron. A few, but very few, new engines and cars were bought. The management was judicious and far-sighted. Well, the sale was finally ordered by the Court. The managers of the Richmond & Danville, and of the East Tennessee, Virginia & Georgia railroads and the Clyde steamship interest were all represented. Each party was anxious to buy, but had a fixed limit. Unfortunately they had not harmoniously co-operated with the receivers, and knew only what they could find out for themselves. The bondholders of the bankrupt corporation were represented by a committee, which was on the ground to see one of two things—either to buy in the road or to enjoy the delight of making some other man pay so dearly for the property that their bonds would realize fifty or sixty cents on the dollar. The sale began, and for the first quarter of an hour the conflicting local interests wrestled with each other. On the edge of the crowd that gathered about the Sheriff's auctioneer stood a man rather under medium height, clad in a long gray overcoat, and perhaps the least demonstrative person present. The terms of the sale had been carefully announced before the fun began. They were, "\$100,000 cash at the time of sale, failing to deposit which the rights of the bidder would be voided and the property resold; the balance of the purchase money to be paid in nine months or the deposit forfeited." These details did not appear to interest the stranger particularly. He only thrust his hands a trifle deeper into his coat pockets and waited. In Virginia, as in Spain, "hope" and "wait" have the same meaning, are the same word.

The Richmond & Danville people dropped out at about \$5,000,000. The Clyde steamship interest held on pluckily and finally distanced the Tennessee & Georgia men in the neighborhood of the seven million and a half post. General Mahone's representatives, controlling the outstanding bonds of the road that was on the block, then "lacked" their only rival, to all appearances. The road was conceded by the bondholders to be a good purchase at \$8,000,000, and before that point they had seemingly cleared the decks. But the stranger had only waited to hear the auctioneer say "going"

once when he manifested an uncommon and, so far as could be judged by others, an unwarranted, interest in the proceedings. He promptly added \$100,000 to the last bid; he then stood a raise of \$50,000 and went \$50,000 better. Now all eyes were centred on him, and everybody was asking his neighbor who the stranger was. Nobody knew. This was his strong point. Neither did they know that he had carefully walked or driven along the entire line of the road within a month previous, and was as well informed of the road's actual condition as if he had built it. After some slow work the stranger, who appeared the embodiment of coolness, put a period to the scene by shouting, "Eighty-five hundred thousand!"

Then the bondholders withdrew for consultation. Even the auctioneer slowly repeated the bid with a strong rising inflection, "Eighty-five hundred thousand dollars?" When he had done so several times, the stranger vouchsafed the simple but firm rejoinder, "That is my bid." The committee of the bondholders returned to the charge, and by gradual steps finally worked up to \$8,600,000 for the franchises and rolling stock of the entire road. The stranger now boldly stepped to the front, as if he meant to stay there, and shouted, "Five thousand more." It is an anti-climax in the tale. So it was in the real drama. The determination he displayed suddenly ended the sale at that point, and, almost hesitatingly, the auctioneer declared the road sold for \$8,605,000. He then asked the stranger his name, but was no wiser when he heard it. "Clarence H. Clark," was the reply; but his actions spoke louder than words, for from an inside pocket he drew out a bundle of exactly \$100,000 in crisp legal tender notes. The sale was legally entered, subject to a future payment of \$8,505,000. It seemed a very simple matter after all, but it was not so trifling to the man who had just put up the "ante" in the game. He had not spoken to a single friend, and had staked the largest part of his fortune on the venture. The rest of the story is familiar financial history. The purchaser hurried to New York and formulated a plan by which \$11,000,000 of 6 per cent. bonds were issued to take up the old scrip; succeeded in forming a syndicate that took at once, \$15,000,000 of 6 per cent. preferred stock at 35% and \$15,000,000 of common stock at an unknown figure. He had already reserved about \$2,000,000 worth of stock for his own trouble prior to this arrangement; the new company organized in Norfolk the other day and its directors are now making their first tour of inspection.

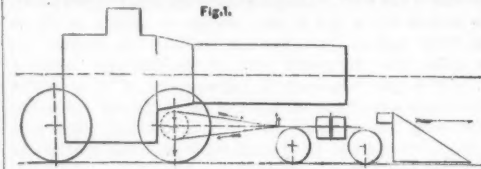
Shocks on Railroad Bridges.

[Paper by John W. Cloud, Altoona, Pa., read at the Philadelphia meeting of the American Institute of Mining Engineers, February, 1881.]

The delivery of blows upon roadway structures by the locomotive engine at high speed, although long recognized,

ditional counterweight at a radius of 12 in. for one wheel on the right side of the locomotive, these components being laid down on a scale of 1 inch = 3,200 lbs., from the line of normal pressure, below or above, according as they are directed upward or downward, and so diminish or increase the load of the wheel upon the rail. It will be borne in mind that this additional 300 lbs. of counterweight, if located, as supposed, with its centre of gravity 12 in. from the wheel centre (the same as crank radius), will move horizontally at all times with the same rate of speed and in an opposite direction to the parts it is employed to balance; if it is of any other weight it must be placed at a corresponding other distance, so that its energy of motion horizontally will at all times be the same; and so, also, vertically, so that the curve given still shows the disturbance of vertical pressures.

The curve *b* shows similarly for one wheel on the left side. This curve is identical with that already detailed, only



one-quarter revolution in advance, as the engine on the left side leads the right by that amount. The line *c* shows the resultant of these two curves, and is for two wheels on one axle, but the curves *a* and *b* must be considered individually as to their effects on tires, rails, and roadway structures.

It will be seen that from this cause there results an increase of 6,260 lbs. above the normal and a decrease of same amount below the normal in the weight of each driving-wheel upon the rail every revolution at the assumed speed of 50 miles per hour, and this cycle is repeated $4\frac{1}{2}$ times every second, so that it is a series of quick blows of magnitude $2 \times 6,260 = 12,520$ lbs.; it is needless to add that, for other speeds, this will increase or decrease with the squares of the speed, and, at 60 miles per hour it will be 44 per cent. greater.

Leaving this for the present, let us look at other vertical disturbances from quite a different source, and applicable to the main pair of wheels only, or that pair to which the engines are directly connected.

Referring to fig. 1, which shows some of the outlines and centre lines of Pennsylvania Railroad, class "B," locomotive, it will be observed that when it is running forward the main rod is pulling obliquely downward on the crank-pin when the latter is above the centre line of cylinder, and that it is pushing obliquely downward on the same pin when the latter is below this line, i. e., except on the two centres, the

sultants of the two opposed forces for each side separately, we have, for the right side, the line *h*, and for the left side the line *k*, while the line *l* is the resultant for both sides. On the assumption above, the main driving-wheels are loaded by this amount at the expense of the truck, through the action of the mechanism. They are really loaded more than the diagram shows, because the relieving action from the rear drivers has been disregarded as somewhat indefinite in magnitude.

The upward reaction on the guides causes the machine to roll, as is often seen when it is laboring hard at slow speed. If the locomotive runs backward the conditions are reversed and main wheels are relieved, the weight being transferred to the truck, so that the weight available for tractive power is less in running backward than it is in running forward.

This concentration of weight on the main drivers varies only with variation of pressures in the cylinder, and is, therefore, independent of speed except as these pressures are varied in consequence. At high speeds this also assumes the character of quick blows on each side, and, of course, at 50 miles per hour the cycle is repeated $4\frac{1}{2}$ times per second as before.

Considering all these disturbing forces on one main wheel only, for the right side, the curve *a* shows the disturbance from counterweight and the curve *b* shows the resultant of disturbing forces from the connecting-rod, while the curve *m* shows the resultant of the two on a scale of 1 inch = 3,200 lbs.

Good practice keeps the counterweight as low as possible, but on express locomotives the disturbances here shown frequently occur at each main wheel and rear wheel respectively at the same time. For each main wheel this is an increase of weight upon the rail of 8,350 lbs. above the statical weight frequently figured on in designing structures, and this increase is followed by a decrease below the normal of 4,250 lbs., making a variation of 12,600 lbs., which, at 50 miles per hour, is repeated $4\frac{1}{2}$ times per second.

For each rear wheel it is an increase of weight upon the rail of 6,260 lbs., followed by a decrease of the same amount, making a variation of 12,520 lbs. $4\frac{1}{2}$ times per second at the same speed, and these variations on one rail are synchronous, i. e., are going through the same phase at the same time; there is, of course, a slight release of weight from the truck at the same time, but this never exceeds 2,600 lbs.

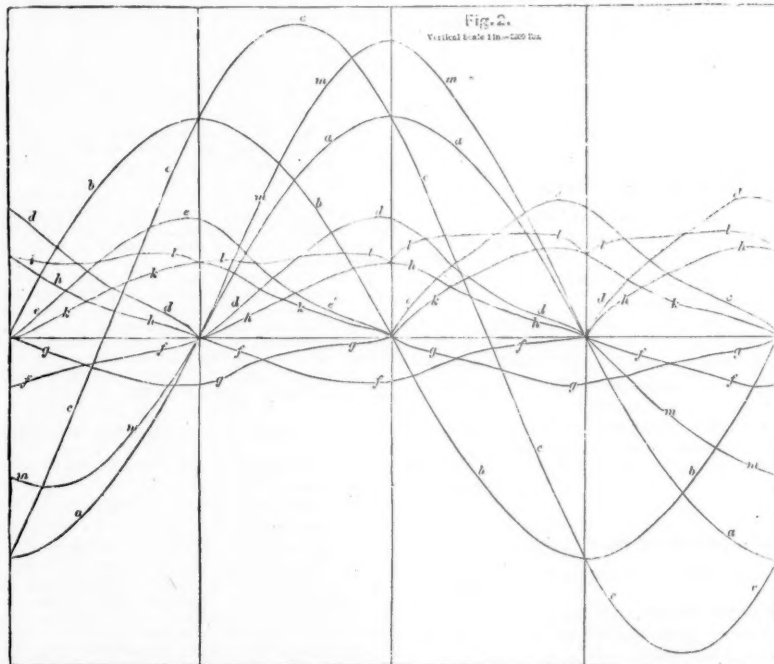
This is, therefore, a series of severe blows, each one directed upon some one point, and it requires but the proper combination of circumstances as to the situation of this point (the location of the other point on same rail being struck at the same time) and the proximity of other heavily loaded wheels to produce the maximum strains upon some member or members of a resisting structure already in a state of oscillation from the regular and successive blows received.

This will account for the necessity of a considerable portion of the factor of safety allowed in such structures as railway bridges, and will also help to account for the failure in service of a certain grade of steel with a factor of safety higher than is successfully allowed with iron in similar structures. (See note on "Steel for Bridges.")

Steel for Bridges.

[Paper by John W. Cloud, Altoona, Pa., read at the Philadelphia Meeting of the American Institute of Mining Engineers, February, 1881.]

In 1877 the Pennsylvania Railroad Company removed an old bridge from its line at Duncannon, Pa., built intermedi-



has, perhaps, not been as generally understood in severity, relation to speed, and cause as is desirable in matters of such importance. Some points of explanation, with illustrative diagrams, are, therefore, submitted to your attention, preparatory to a note on "Steel for Bridges," also submitted.

In order that a locomotive may run at high rates of speed without fore-and-aft irregularities of motion, it is necessary that counterweight be added to the driving-wheels, not only for crank-pin hold, crank-pin, and weight carried thereon, but also for the weight of those parts which move only in a horizontal direction, viz., piston, piston-rod, cross-head, and that part of the main rod carried by the cross-head. This additional counterweight is usually divided equally between all the driving-wheels, and, in the case of a Pennsylvania Railroad standard locomotive, class "B," it requires an addition of counterweight to each wheel equivalent to 300 lbs., at a distance of 12 in. from the wheel centre, to properly control the motion. This brings correspondingly too much counterweight vertically, but it does not result in objectionable disturbances because the forces are resisted by the road-bed in one direction and by the weight of the machine in the opposite direction.

In locomotives for low speed only, a part of this additional counterweight can be left out without apparent evil results, but in express locomotives it is necessary to use nearly all that the theory requires. From this cause a series of blows results, which we may examine by the aid of the diagram on the accompanying plate (fig. 2) a little more in detail.

The length of this diagram, from left to right, represents one revolution; the vertical scale is 1 inch = 3,200 lbs., and the horizontal line through the centre is a line of normal pressure of one wheel upon the rail; i. e., it is a sufficient distance above an imaginary datum line below, and entirely off the diagram, to represent, on the same scale, the quiescent weight of the wheel on the rail. The speed is assumed at 50 miles per hour, and one revolution is considered commencing when the engine on right side is on its first quarter; that is, when the counterweight on the same side is in its highest position. The curve *a* shows the boundary of the vertical components of the centrifugal force of 300 lbs. ad-

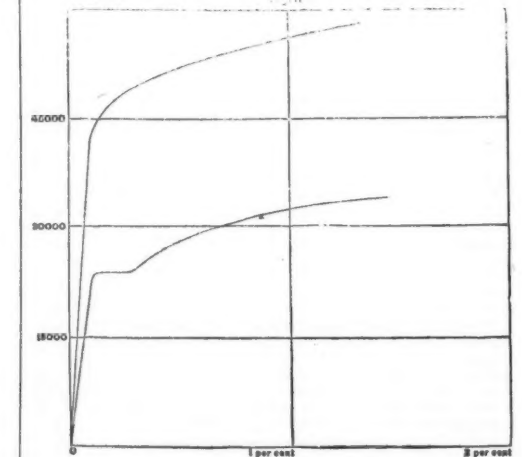
ditional counterweight at a radius of 12 in. for one wheel on the right side of the locomotive, these components being laid down on a scale of 1 inch = 3,200 lbs., from the line of normal pressure, below or above, according as they are directed upward or downward, and so diminish or increase the load of the wheel upon the rail. It will be borne in mind that this additional 300 lbs. of counterweight, if located, as supposed, with its centre of gravity 12 in. from the wheel centre (the same as crank radius), will move horizontally at all times with the same rate of speed and in an opposite direction to the parts it is employed to balance; if it is of any other weight it must be placed at a corresponding other distance, so that its energy of motion horizontally will at all times be the same; and so, also, vertically, so that the curve given still shows the disturbance of vertical pressures.

On the diagram (fig. 2) again, the curve *d*, above the horizontal line of normal pressure, is the boundary of the vertical components of the force exerted by connecting-rod on the crank-pin during one revolution. This curve lies wholly above the line of normal pressure, except two points which are in this line, because, as already stated, the vertical component, when there is any, is always directed downward in running forward, and therefore increases the pressure on the rail.

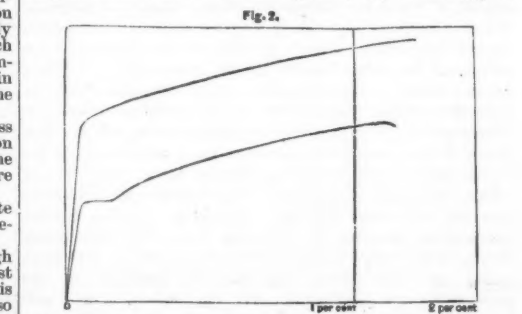
In plotting this curve the conditions prevailing in this class of locomotive have been observed, with the assumption that the cut-off occurs at one-half the stroke, and that the cylinder pressure, up to time of cut-off, is 110 lbs. per square inch.

The corresponding line *e* shows the same for the opposite main wheel, being one-quarter revolution in advance, as before.

As this vertical force is consequent upon exertion, through mechanism, of a horizontal force in the cylinder, there must be at all times an equal reaction vertically upward; this is by the cross-head thrusting against its upper guide, and so far as this force goes it tends to reduce the aggregate weight of the machine on the rails by just so much as we find it increased at the main driving wheel at all times. The upward force, however, from the varying location of its point of application, is variously distributed at different times as to its relieving effects from driving-wheels and leading truck-wheels. Disregarding the relief from the rear driver, and supposing it all distributed, for the right side, between the main wheel and the truck, it will be found, in plotting, that the curve *f*, below the line of normal pressure, is the boundary of relieving forces at the main wheel for one revolution, the remainder going to relieve the weight on the truck. The corresponding line *g* shows the same thing for the left side, and is one-quarter revolution in advance. Taking the re-



ate piers and erected shorter spans of the Pratt truss type, which had previously been in use on another portion of the road. The design of this truss would not admit of diagonals larger than $1\frac{1}{2}$ in. diameter, and in order to stiffen the bridge somewhat steel rods were introduced for the main diagonals in the first and second panels, $1\frac{1}{2}$ in. and $1\frac{1}{2}$ in.



diameter respectively. These rods were threaded without upsetting, and by the ordinary formulae the strains were of the same intensity upon both, viz., 16,000 lbs. per square inch with the maximum loading. The other main diagonals in the truss are $1\frac{1}{2}$ in. diameter, and of iron.

It was specified for the steel rods:

| | |
|-----------------------|--------------|
| Elastic limit..... | 45,000 lbs. |
| Tensile strength..... | 80,000 lbs. |
| Elongation..... | 20 per cent. |

The steel was procured without difficulty, and it allowed a factor of safety of $2\frac{1}{2}$ at elastic limit, while a similar factor of $2\frac{1}{2}$ had for a long time been successfully used for iron.



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EDITORIAL ANNOUNCEMENTS.

Passes.—All persons connected with this paper are forbidden to ask for passes under any circumstances, and we will be thankful to have any act of the kind reported to this office.

Addresses.—Business letters should be addressed and drafts made payable to THE RAILROAD GAZETTE. Communications for the attention of the Editors should be addressed EDITOR RAILROAD GAZETTE.

Advertisements.—We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay, EXCEPT IN THE ADVERTISING COLUMNS. We give in our editorial columns OUR OWN opinions, and those only, and in our news columns present only such matter as we consider interesting and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.

Contributions.—Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies, the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and in their management, particulars as to the business of railroads, and suggestions as to its improvement. Discussions of subjects pertaining to ALL DEPARTMENTS of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.

THE SCHOOLING OF ENGINEERS.

It often happens that an old-fashioned homely word will express an idea with more force and precision than one of more modern usage, and which, it may be, is considered more elegant. Thus, in the above title the word "education" was first used. This, however, seems to imply more than was meant, as what is to follow is intended to refer to that training which a young man would get in school alone, and not to that other portion of his education which he acquires by experience and the practice of his art or profession. The word "schooling," that is, the training which he gets in school, therefore designates the subject of which some observations have been suggested by the liberality of President Morton in fitting up and equipping a machine shop and presenting it to the Stevens Institute of Technology, at Hoboken, of which an account will be found on another page. It is difficult to express properly the regard in which such liberality is held. Adjectives somehow fail to convey just what they are intended to, and therefore an idea of the munificence of the gift can be conveyed best by describing its beneficence. It is for this reason in part, and also to add something to the process of mental evolution which is going on in relation to the school training, or more briefly, the "schooling" of engineers, that the title above has been chosen for this article.

The opinion has been advanced in these pages before that it would be a positive benefit to mankind if the word "engineer" could be obliterated from our language. The generally recognized definition, given in charter of incorporation of the Institution of Civil Engineers, that it is, "the art of directing the great sources of power in nature for the use and convenience of man," is so vague and indefinite that it often leads to much confusion of mind. There can be no doubt too that the euphony of the word "engineer" has attracted many persons to it [as an occupation. It sounds well to be called an engineer, and the profession embraces immense possibilities. A young man's sisters, his potential or actual wife like to speak of him as an "engineer," and doubtless think with pride of his "directing the great sources of power in nature." All this gives a kind of glamour to what is in fact a very prosaic occupation, and which has, in a great measure, become so by a process of development and differentiation. The engineer as contemplated in the definition quoted and as expressed in the latter part of it, that is a man who builds roads, bridges, aqueducts, canals, docks, harbors, moles, breakwaters and lighthouses, who constructs and adapts machinery and drains cities and towns, no longer exists. The universal engineer has become extinct, and in his place we have a great variety of specialists, each one engaged in a business which will require all his time and abilities to master thoroughly. The construction and adaptation of machinery, which is passed over so lightly in the charter of the Institution of Civil Engineers, has grown to enormous importance, and is subdivided into innumerable separate branches. The time was when the engineer who built a railroad was expected not only to locate the line, but design the bridges, the locomotives, the cars, and, in fact, the whole equipment. At the present time the latter is made in a great many different manufactories, in which the principle of division of labor is carried to extreme limits. Even before the engineer has graded his line he goes to one manufacturer for excavating machines and tools, to another for a portable railroad, and still another makes his rock-drills. Some engineers now design their own rail sections, but it is very generally agreed that the time is not very far distant when these will be suppressed. Rail fastenings and even the nut-loops are a separate article of manufacture. Switches, frogs, signals, turntables, bridges, locomotives, cars, shop-machinery and so on almost without end are made in special establishments. When we come to the three latter, they are again subdivided.

The injectors on the locomotive are made in one shop, the steam-gauges in another, the head-lights, brake apparatus, springs, truck-wheels, tires, etc., etc., have all become articles of special manufacture. That is, we find men engaged in producing some one of these articles and that alone.

Instead of the engineer, then, in the general sense, we have a great and growing variety of occupations, whose purpose it is to produce or manufacture certain articles. It is true that these men are "directing the great sources of power in nature for the use and convenience of man," and they therefore should have a knowledge of the laws which govern that power and the means by which it may be controlled; but it is obvious that the term engineer does not, excepting in a very generic sense, designate the occupation of such persons. The attempt has been made to specialize the occupation, by calling one a signal engineer, a bridge engineer, etc., etc., but the usage is by no means common. There is an obvious philological inconsistency in such a combination of words. An engineer is a man who builds or has the care of engines, and therefore a maker of signals should be a signaller, which is not a bad word, but then we could not well say a bridgeer, or a switcher, so that this principle would not permit of universal application. It would be a positive boon to the language if some word could be added to it which would have somewhat the meaning of the word *artificer*, and which would imply that a person was a maker of a machine or other structure, not in the sense of doing the mechanical work alone, but that he also was a designer, and had a knowledge of the science as well as the art of his business. If the occupations which are now classed vaguely and generally as "engineering" were thus specialized, it is believed that one of the difficulties under which the subject of the schooling of engineers is regarded would disappear. The question then would be how to educate boys who are to become artificers or manufacturers of locomotives, cars, bridges, signals, injectors, steam gauges, etc., etc. If the question is put in this way, it at once becomes apparent that the special knowledge required in conducting such a business can only be learned where the conditions exist which must be observed to insure its success. That is, in a manufactory itself. It would be hopeless to expect that in any school, a shop, even in miniature, could be established for each one of the branches of engineering for which young men must be educated. If they were, it is certain that they would be managed in such a way that under no circumstances could they succeed in competition with other shops. We have not yet advanced so far that we have separate schools for educating young men to become manufacturers of cars, of rails

or locomotives, although that may ultimately be the case. The question then is, what have all the different occupations designated, and many others which have not been designated, in common which may be taught in a school. Now, we believe that most persons who have reached middle life, and who received their education thirty years ago, will be surprised to find the extent to which what we will call practical knowledge has, as it were, crystallized and become common to all or most of what we will class as engineering occupations. From this knowledge should be excluded all that which is usually classed as science, and which is and has been for a long time taught from text books. A few titles, copied from Clark's "Manual for Mechanical Engineers," will illustrate the class of subjects to which we refer. There is, of course, the steam engine with its allied subjects, which now has its own literature, and forms almost a distinct course of itself. The performance and testing of steam engines and boilers can be learned in a technical school as well as any where else. There is, too, the strength of materials, a knowledge of which can hardly be learned without the actual experiments; strength of elementary constructions, such as riveted joints, pillars or columns, beams, rails springs, bolts and nuts, screwed stay-bolts, cranes, girders, roofs, etc. The laws of friction, the principles of toothed gear, frictional wheel-gearing, belts and belt-pulleys, rope gearing, shafting, etc., have all been formulated into very distinct and definite principles and practice. The construction of tools for working wood and metal, wrought and cast-iron pipe fitting, screw threads, pattern-making, molding and founding and mechanical drawing. Such knowledge is useful in nearly all engineering work, and the principles of each may be very thoroughly taught and learned in a technical school, if properly equipped with tools, and supplied with competent teachers. The economical features of a business, the buying and selling, the means of production at the lowest cost can, it is believed, only be learned under the stimulus of competition. It will be an immense advantage to a young man if, besides having a more or less thorough knowledge of mathematics and science, he can enter a shop, engaged in any one of the branches of business named, with some information about the uses and construction of machine tools, shafting, gearing and other subjects which have not been named, but which are used in most branches of engineering business, and are every year being formulated into definite principles.

The idea that expert workmen can be made in a school of this kind has always seemed a mistake. That it is possible to do so is probably true, but the cost of doing it is too great for the results achieved. To devote an expensive building and high-salaried instructors to teaching what could be learned in a cheap shed and taught by an intelligent journeyman mechanic, seems to be a misapplication of means to ends. If mere manual skill alone is taught and learned, the teaching costs more than the knowledge acquired is worth. The question should be very distinctly asked: What will the student be fit for when his course of study is completed? Some of the manual training which is given to boys in school, it must be confessed, seems very futile. It makes neither good workmen nor is it apparent how it will be valuable as training for any other position. The skill acquired is practically useless, and it is hard to see what else is learned excepting how to use tools in a very ineffective way. A test which it seems should be applied to all such methods of teaching is the question, What is the student learning besides skill in handling tools, and is that worth the time, trouble and expense? If what may be called the secondary knowledge resulting from manual training is not worth what it costs, we confess that it seems as though it would be better to put young men under the instruction of an intelligent mechanic, where he would have the old-fashioned training of an apprenticeship, which teaches at least industry and endurance, and from which drudgery is not eliminated. The catalogue of one of the schools which has a department of manual training says its work never "descends into drudgery." The graduates will be fortunate beyond most men if, when they leave their school, they will be able to escape that which falls to the lot of most of us, and the discipline of which is altogether rather wholesome.

As an aid to teaching other things, a work-shop of the kind that the Stevens Institute now possesses has very great value. It supplies the means of teaching by object lesson, as it were. It materializes what the books contain, and presents to the mind an indelible image, which is the very heart or nucleus around which the student's knowledge will cling. To see the advantages which they possess, though, adds another regret to advancing age; but it is full of promise to the generation which is to succeed us.

THE WINTER GRAIN MOVEMENT.

Lake navigation opened May 3 this year, having closed before the end of November, and there were thus more than five months during which there were no lake or canal shipments, while last year the lakes having opened April 3, lake shipments ceased but four months.

Last year special interest attached to the winter grain movement because it was the first winter since the business became heavy that remunerative rates had been maintained throughout the season. A very heavy winter movement had been had at 20 cents or less per 100 lbs., but it was questioned whether a remunerative rate would permit any considerable shipments for export; yet a rate of 40 cents was maintained until March, and of 35 cents during March, 1880, and yet the winter grain movement was larger than in any previous year.

Still, this was the first winter of maintained rates; there was a general disbelief in the success of the effort to keep up the rates, and consequently the trade had made its arrangements based on the expectation that rates would take their usual course, and before midwinter be about as low as lake and canal rates are in the fall. Consequently the movement may have been larger than if the maintenance of rates had been expected. Further, wheat that winter was unusually high, and could the better bear a high winter rate.

But last winter everybody must have expected that rates would be maintained, and made his preparations accordingly. Moreover, wheat was much lower than the year before. The winter rate was made 35 cents instead of 40, to be sure, but the effect of this second winter of generally well maintained rail rates it is very important to study, as the future course of rates, traffic and earnings will be affected by it.

The receipts and shipments of grain of all kinds at the seven reporting Northwestern markets, St. Louis, Peoria, Chicago, Milwaukee, Detroit, Toledo and Cleveland, and the receipts of the seven Atlantic ports, for the five months ending April 30 (December to April inclusive), during which this year lake and canal navigation was closed, have been as follows, in bushels, flour not included, for the past eight years:

| Year. | Northwestern receipts. | Northwestern shipments. | Atlantic receipts. |
|-----------|------------------------|-------------------------|--------------------|
| 1874..... | 54,235,578 | 29,499,348 | 41,027,047 |
| 1875..... | 35,930,337 | 18,005,849 | 23,686,804 |
| 1876..... | 48,024,441 | 30,197,372 | 39,269,065 |
| 1877..... | 43,358,882 | 26,600,317 | 40,903,919 |
| 1878..... | 61,097,698 | 44,475,196 | 72,615,901 |
| 1879..... | 64,389,922 | 40,377,517 | 78,692,230 |
| 1880..... | 82,126,468 | 56,218,711 | 84,000,064 |
| 1881..... | 74,757,807 | 49,355,803 | 74,601,389 |

The receipts of the Northwestern markets this year, therefore, were 9 per cent. less than last year, but 16 per cent. more than in any previous year. The shipments of these markets were 12½ per cent. less than last year, but more than in any other year. Last year during these five months lake navigation was open four weeks, and the lake shipments amounted to more than 14,000,000 bushels, so that if we take the rail and river shipments by themselves, they were one-seventh larger than last year during the same five months. The Atlantic receipts were 11 per cent. less than last year and 5 per cent. less than the year before.

The excess of Atlantic receipts over the shipments of the great Northwestern markets was less last winter than for three seasons previous, indicating that a smaller proportion has been forwarded from the farmers' stations directly through to the East, without the intervention of these markets. These excesses of Atlantic receipts over Northwestern shipments have been, in successive years:

| Year. | Bushels. | Year. | Bushels. |
|-----------|------------|-----------|------------|
| 1874..... | 11,527,699 | 1878..... | 28,140,705 |
| 1875..... | 5,080,955 | 1879..... | 38,314,719 |
| 1876..... | 8,471,693 | 1880..... | 27,781,353 |
| 1877..... | 14,303,602 | 1881..... | 25,335,586 |

This excess does not measure the whole movement from the West to the East that avoids the Northwestern markets, for not all the shipments of these markets are to the Atlantic ports, while the supplies for domestic consumption of interior Eastern towns very largely come through from the small stations in the West. But as the Eastern consumption does not vary greatly from year to year, the differences between Northwestern shipments and the Atlantic receipts, as given above, give a pretty fair idea of the fluctuations in that part of the grain movement which is carried on without the intervention of the great Northwestern markets.

The flour movement having increased greatly this year, we must consider last winter's movement as eminently satisfactory.

We have not heretofore traced the fluctuations in the receipts of the several Northwestern markets from month to month (only from year to year), but the recent large shipments down the Mississippi and the effect of these in determining the movement to and from the different Northwestern markets lead us to

give more attention to these, for which, however, our statistics do not go back of 1880.

Receipts of grain of all kinds at the seven reporting Northwestern markets for the four months ending with April for the past two years have been, in bushels:

| | 1881. | 1880. | Inc. or Dec. | P. c. |
|----------------|------------|------------|-----------------|-------|
| St. Louis..... | 12,381,001 | 15,153,400 | Dec. 2,772,399 | 18.3 |
| Peoria..... | 7,523,230 | 6,466,555 | Inc. 1,056,675 | 16.3 |
| Chicago..... | 17,928,473 | 24,719,740 | Dec. 6,791,267 | 27.4 |
| Milwaukee..... | 4,122,329 | 4,313,021 | Dec. 190,692 | 4.4 |
| Detroit..... | 2,023,315 | 2,062,229 | Inc. 38,914 | 1.9 |
| Toledo..... | 6,024,070 | 8,392,463 | Dec. 2,368,393 | 28.2 |
| Cleveland..... | 1,528,300 | 1,388,838 | Inc. 139,462 | 1.0 |
| Total..... | 52,130,808 | 62,487,246 | Dec. 10,356,438 | 16.6 |

The increases and decreases at the different places would have been very different had the figures included flour. There has been a very large increase in the flour receipts and these have been chiefly at Chicago and Milwaukee.

The only notable increases are at Peoria and Detroit; much the largest decrease was at Chicago, but that at St. Louis was also large, and if flour receipts were included doubtless the percentage of decrease would have been larger at St. Louis than at Chicago; but we should remember that river shipments first became large in 1880, and that if we went back to previous years we should doubtless find that St. Louis has gained largely in rank as a grain receiver. The percentage of decrease is largest at Toledo, which has light flour receipts.

The percentages of the total received at each of these markets in the two years were:

| | 1881. | 1880. |
|----------------|-------|-------|
| St. Louis..... | 23.8 | 24.3 |
| Peoria..... | 14.4 | 10.3 |
| Chicago..... | 34.4 | 39.6 |
| Milwaukee..... | 7.9 | 6.9 |
| Detroit..... | 5.0 | 3.3 |
| Toledo..... | 11.6 | 13.4 |
| Cleveland..... | 2.9 | 2.2 |
| Total..... | 100.0 | 100.0 |

The gains in percentages of the whole have been at Peoria, Milwaukee, Detroit and Cleveland—very large at Peoria; and the losses at Chicago, Toledo and St. Louis—slight at St. Louis. Many will doubtless be surprised to learn that St. Louis receipts have not only been less, but a smaller proportion of the whole than last year. For the last two months its receipts were exceptionally large, but not for the whole four months.

The season of closed navigation cannot be said to have ended yet for Atlantic receipts, for the Erie Canal was not opened at Buffalo until the 17th, and boats thence will not arrive at New York until June. The receipts by boats frozen in on the canal last fall and at Montreal from lower lake and Canadian ports will not be important. But for the five months from December to April, inclusive, the receipts of these ports have been, for the last five years:

| | 1876-77. | 1877-78. | 1878-79. | 1879-80. | 1880-81. |
|-------------------|------------|------------|------------|------------|------------|
| New York..... | 12,921,804 | 29,663,298 | 31,525,074 | 31,969,686 | 29,086,761 |
| Boston..... | 4,795,190 | 5,752,370 | 7,181,636 | 7,870,416 | 9,458,757 |
| Portland..... | 768,473 | 1,436,121 | 1,050,391 | 1,727,729 | 1,206,507 |
| Montreal..... | 123,965 | 71,960 | 102,430 | 313,816 | 249,725 |
| Philadelphia..... | 7,339,150 | 14,131,980 | 14,936,920 | 14,136,810 | 9,855,240 |
| Baltimore..... | 12,103,794 | 15,165,200 | 17,984,850 | 18,173,717 | 16,466,550 |
| New Orleans..... | 2,991,004 | 6,395,503 | 5,961,734 | 9,807,890 | 8,277,849 |
| Total..... | 41,131,389 | 72,616,501 | 78,743,064 | 84,000,064 | 74,591,389 |

The aggregate Atlantic receipts were thus 9,500,000 bushels less than last year, and 4,150,000 less than the winter before, but larger than in previous years. The only port showing larger receipts this year than last is Boston; Philadelphia's decrease is 4,300,000 bushels, New York's 2,900,000, Baltimore's 1,700,000, New Orleans' 1,500,000, Portland's 400,000. New York's decrease in grain has been about made up by its increase in flour, and there are no important flour receipts except at New York and Boston. The increase at Boston (20 per cent.) in the face of a decrease (14 per cent.) at the other six ports is remarkable, and we are not able to explain it.

The percentage of the total receipts arriving at each of the seven ports each winter of the five has been as follows:

| | 1876-77. | 1877-78. | 1878-79. | 1879-80. | 1880-81. |
|-------------------|----------|----------|----------|----------|----------|
| New York..... | 31.4 | 40.8 | 40.0 | 38.1 | 39.0 |
| Boston..... | 11.7 | 7.9 | 9.1 | 9.4 | 12.7 |
| Portland..... | 1.9 | 2.0 | 1.3 | 2.0 | 1.7 |
| Montreal..... | 0.3 | 0.1 | 0.1 | 0.4 | 0.3 |
| Philadelphia..... | 17.8 | 19.5 | 19.0 | 16.8 | 13.2 |
| Baltimore..... | 29.6 | 20.9 | 22.9 | 21.6 | 22.0 |
| New Orleans..... | 7.3 | 8.8 | 7.6 | 11.7 | 11.1 |
| Total..... | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |

The places which have higher rank this year than last are New York, Boston and Baltimore. New York had larger percentages in 1878 and 1879, but if we leave New Orleans out of the account, and compare only the six eastern ports, New York's proportion is larger than in any other of the five years except 1878, and nearly as large as then.

Comparing the percentages of New York with those of Philadelphia and Baltimore taken together we have:

| | 1876-77. | 1877-78. | 1878-79. | 1879-80. | 1880-81. |
|---------------------------------|----------|----------|----------|----------|----------|
| New York..... | 31.4 | 40.8 | 40.0 | 38.1 | 39.0 |
| Philadelphia and Baltimore..... | 47.4 | 40.4 | 41.9 | 38.4 | 35.2 |
| The three cities..... | 78.8 | 81.2 | 81.9 | 76.5 | 74.2 |

This year New York has a considerably larger percentage than the other two cities together, which has not happened before in the five years, though in 1877-78, New York had a little the more.

Comparing New York and Boston taken together, with Philadelphia and Baltimore taken together we have:

| | 1876-77. | 1877-78. | 1878-79. | 1879-80. | 1880-81. |
|---------------------------------|----------|----------|----------|----------|----------|
| New York and Boston..... | 43.1 | 48.7 | 49.1 | 47.5 | 51.7 |
| Philadelphia and Baltimore..... | 47.4 | 40.4 | 41.9 | 38.4 | 35.2 |
| The four cities..... | 90.5 | 89.1 | 91.0 | 85.9 | 86.9 |

The percentage of the two northern cities this year is the largest while that of the two southern cities is the smallest for five years. This being the season when none of the places has any advantage from water routes, this indicates the comparative success of the several cities in securing the grain trade by rail, with the existing differences in rates. Considering the nature of the last season, when the northern roads were much interrupted by snow, the success of New York and Boston in securing a larger share of the trade than heretofore seems quite remarkable.

Last year the May movement was extraordinarily heavy. This year, so far, it has been much lighter, and the movement corresponding with last year's May movement seems not likely to begin much before June.

THE CATTLE AND BEEF TRAFFIC.

The live-stock traffic is one which ought to afford the railroads one of their steadiest and best sources of profit, it being very large, and not capable of diversion by lake, canal and river routes, and, so far as cattle are concerned, necessarily conveyed every week of the year, in proportion to the Eastern consumption of beef, and not liable to be three or four times as great at certain seasons as at others; so giving steady employment to the stock cars. The latter, it is true, are not fitted for carrying merchandise west on their return, but they could be used for coal, and probably would be to a much larger extent than at present were it not that there are plenty of box cars for that traffic, and there is usually more haste to return the stock cars. The latter, however, are largely used for carrying coke west from Pittsburgh. But although this traffic is naturally a source of unusual profit, circumstances have made it, on the average, for some years, one of the least profitable branches of through traffic, and largely, we are bound to say, by the fault of the railroads themselves. The combinations to maintain rates which have been so effective in other branches of traffic, and which have been made with unusual care for this, have failed signally in this; partly because of the nature of the traffic, but largely and chiefly, we imagine, because of years of faulty policy under which large shippers were given advantages in rates which finally enabled some of them almost to monopolize the business in certain quarters, and enabled them largely to dictate to the railroads whose favors had built up their business. No sympathy need be wasted on the railroads under these circumstances: they are simply suffering the consequences of their own sins—sins, however, which it was impossible to avoid without co-operation among the several roads carrying live stock. But it is a matter of public concern, as well as in the interest of the railroads, that the people engaged in the cattle and meat business should have a fair field and no favors. They will not complain of rates which give the railroads good profits, if they can be assured that they shall have equal rights as shippers. That is, the great bulk of those who sell in the West and buy in the East will not complain: of course, those who have secured a monopoly of the business by special rates will complain of anything which tends to deprive them of their monopoly.

The latest settlement of the live-stock business, which was about two years ago, we believe, seemed to be a complete remedy for the evils that had existed theretofore. The business at the Western markets was divided among the different lines in agreed proportions, and in order to secure the shipments in those proportions a rebate of about one-sixth was given to those shippers who would ship by such routes as the joint agent of the associated roads should direct. This worked well for some time, and probably would have worked perfectly but for a competition, recently springing up, to which live-stock shipments are now subject. This is the trade in dressed beef shipped in refrigerator cars from the great Western cattle markets (chiefly from Chicago and Kansas City) to the East. At first these shipments were largely or chiefly for export; latterly by individual effort a trade has been established which extends not only to the large cities but also to the interior points of the East—at least of New England—where the dressed beef comes in competition with the cat-

the brought also from the West. It might seem that the remedy for the trouble arising here is to divide the dressed beef traffic also, and to make a reasonable and fixed difference between the cattle and the dressed-beef rate. This is not so simple a matter as it seems, however. The dressed beef has not been carried by all the roads alike, but by one only, the Grand Trunk, and this business is in the hands of one man, who has his customers throughout New England, and it has scarcely any live-stock traffic to these New England towns. On the other hand, the live stock with which this dressed beef competes is also carried chiefly by a single road, the New York Central, and is likewise substantially in the hands of a single shipper, who has his own stock-yards, from which he distributes his cattle. Now, when the dressed beef began to reduce the demand for live cattle in the New England towns, naturally the New England live-stock shipper called on the New York Central and its connections to "protect" his business and their traffic by reducing rates so as to bring up the cattle consumption to the old figures, and this being granted (whether the first reduction was on cattle or dressed beef we do not know and does not matter), naturally the dressed-beef shippers called on the Grand Trunk for similar "protection" of their common interests; and so the matter followed the usual course, and, however the shippers may have fared, the railroads were carrying the costly live stock traffic for less than the rates on grain, and probably not making a cent out of it. And when rates went down to 25 cents per 100 lbs. to Worcester and Boston they could not be kept up to 50 cents to New York and 48 to Philadelphia, and so the competition between one shipper of cattle and one shipper of dressed beef to New England has demoralized the whole live-stock business, first resulting in concessions to the principal shippers, which either destroyed or made unprofitable the business of all the other shippers, and then in this open and general reduction of the live-stock rates to one half of the regular rates, which the business is abundantly able to bear, and against which there have been no complaints.

It may seem hard that the competition of two shippers should destroy the value of an immense traffic, not only in the field where these shippers compete, but over the rest of the country also; but this is one of the incidents of the transportation business, and simply illustrates how inextricably connected are its different branches and how far-reaching its effects; and also how indispensable it is that traffic managers should have minds broad enough to keep in view the whole of the immense field in which industry and business interests are affected by every modification of rates.

As to the settlement of this particular difficulty, it will not be found easy. However faulty the policy that has permitted the practical monopolization of the business of supplying beef to large districts of country, the persons who do that business have now acquired certain rights which cannot be ignored. They have in their hands now certain facilities provided by their own capital, which will perhaps prevent any third parties from competing with them, even with the same rates for transportation: it may be like the Standard Oil Company, which, having used one railroad against another to secure for itself advantages against all competitors, finally was able to dictate to the railroads, and provide means by which it does without their aid for a very large proportion of its transportation. But the least the railroads can do is to make their rates equal to all. This alone, however, will not settle the difficulty between live-stock and dressed-beef shippers. The latter, it seems, have a much greater advantage in winter than in summer, and in some places than in others. There are places which cannot take much more than a quarter or half of an animal, or at which it is very inconvenient to slaughter, and these will take dressed beef at rates which will not attract any trade from other places, where live cattle will be preferred. But the owners of stock-yards and stock cars do not like to have their property lying idle in summer. So, at other times and places, with the owners of refrigerator cars and the carriers of dressed beef. If all lines carried both kinds of traffic alike, the trouble could be more easily settled. Then if and when dressed beef has any advantage over live cattle, it would secure the market, and the business would secure that development which its merits deserve.

HIS OWN FAULT.

Few rules of law are so firmly established and so imperative as this: That it is a good answer to any one's suit for damages for a negligent injury to show that the disaster was "His own fault." If his fault or neglect contributed to produce his loss or hurt, he cannot recover. The rule is limited to actions for

negligence; when a wrong is wilfully done—if, for example, an engineer intentionally runs over a foot traveler—it is not a defense to say that the plaintiff is chargeable with some want of care; that he did not watch for the engine. The rule is, moreover, somewhat curiously confined to dry land. Why injuries on land and disasters at sea should be subjected to different rules in this respect—why the common-law courts should enforce the defense of contributive negligence and the courts of admiralty discard it—is not easy to explain, except historically; by saying that such has always been the habit and such are the precedents of the two courts. If a steam vessel runs down a schooner, a court of admiralty, in a suit for collision, will "apportion" the damages between the two ships, notwithstanding there was mutual fault. But if a train of one company is wrecked at a crossing of tracks, by collision with a train of another, no damages can be recovered if the engineer of the injured train was seriously careless, whether he or the offending train was in fault or not. Thus the rule of contributive negligence must be deemed limited to suits founded on negligence and tried in the ordinary common-law courts. There are some intricacies and unsettled questions relative to imputing negligence of one person—a parent, guardian or nurse, for instance—to the person actually injured, such as a little child; and as to allowing a person whose fault was very slight to recover from one whose neglect was gross. Aside from these limitations and special doubts the rule is applied with great uniformity and very little hesitation. Yet, if one may judge from the number of actions which are every year brought, against railroad companies especially, only to be summarily defeated by an easy and clear showing that the injured person was himself in fault, it is but little understood. All the circumstances which bear upon the question of contributive negligence must necessarily be peculiarly within the plaintiff's knowledge. If his disclosure of the facts of his case, as known to him, to his own lawyer, at the outset, is frank and full, the latter ought to be, in nine cases out of ten of such as are constantly prosecuted, able to tell him that he has no case. Yet the court reports disclose a constant succession of fruitless suits in which the plaintiff, to be sure, shows some fault on the part of the management of a train, but his suit is defeated by counterproofs of his own negligence. Apparently there is strange ignorance of the rule or gross inattention to it.

It would not be possible to compress within an article any instructive mention of all the decisions contained in the court reports of the winter, involving the defense of "His own fault." Several have already been stated in these columns. We can select for comment a few more in which the circumstances were somewhat novel, and the application of the principle was peculiar or doubtful.

Contributive Negligence of Passenger.—The Oregon & California Railroad Company maintains at Portland a steam ferry-boat for the purpose of carrying passengers, from their arrival at the end of its road proper, across the Willamette River, and landing them fully in the city. A belated train, arriving one evening after dark, transferred its passengers, Perkins being one of them, to this boat to be ferried across. The boat was fitted with a chain-guard to check passengers from stepping ashore before the boat should be made fast and the chain let down. For some reason not disclosed, the chain-guard was not put up in place on that night. As the boat approached the landing Perkins walked forward toward the bow, ready to jump or step ashore. The captain and hands shouted to him that the boat had not landed, and that he should "stand back;" indeed, one of them pulled him back. He, however—there was some evidence of intoxication—pressed forward, stepped off the bow of the boat while it was yet two or three feet from the ferry bridge, fell into the water, and was drowned. A suit for damages was brought upon the ground that the railroad company was bound to maintain its chain-guard or other similar means of preventing passengers from landing prematurely; and that if no reasonable barrier was interposed to prevent passengers from landing, a passenger was justified in supposing that an attempt to land would be safe. But the Court decided that such a general principle, though probably sound, could not be applied in this case, where deceased was personally warned and cautioned. The remonstrance of the ferry boat hands was equivalent in law to a chain-guard, and the passenger in disregarding it clearly brought the disaster upon himself by his own fault. After this defeat, another administrator was appointed, and he brought a suit in admiralty. The testimony of the witnesses as to the details of the casualty was now somewhat different. The admiralty judge said that he considered the company clearly in fault in not pro-

viding a substantial barrier to keep passengers from going ashore. He disregarded the charge of contributive negligence as not proved, and he awarded \$1,000 damages. A different view may be taken on appeal.

Contributive Negligence of Employee.—As it is the duty and tends to the interest of the company that an engineer should maintain a good rate of speed, it might seem that one who sustains an injury through essaying high speed should not be pronounced in fault. But clearly his duty in this regard may be limited by his instructions or the time-table. An engineer on the Illinois Central road, whose time-card called for 24 miles an hour, and for a slower rate at some spots where the track was out of repair, crossed one of these weak spots at a rate of between thirty and forty miles. His engine left the track and he was hurt. The Court said that his excessive speed was gross negligence which undoubtedly contributed to his injury, and must preclude him from recovering damages, however gross the neglect of the company might have been in allowing the track to fall into decay.

An engineer on the Chicago, Burlington & Quincy road was killed by being knocked from his engine (or from a bridge or trestle on which he had mounted), no one could ascertain precisely how, while oiling it. The place where the oiling was done, in this instance, and where the engineer had previously been accustomed, though not invariably, to stop for oiling, appeared to the Court to be a dangerous and injudicious one. Yet it did not appear that there was any rule of the company requiring the engine to be oiled or examined at this particular spot. On the contrary, the spot was selected by the engineer himself, and he might have chosen a different one. The structures of the company at the place were sufficient for their intended uses; they were not planned with a view to the engineer's climbing upon them while oiling. The Court said that the engineer was chargeable with contributive negligence; and that the company was not bound to protect him against danger arising from a use which he made, without necessity and without instructions, of structures made for other purposes.

At the crossing of the Eastern Railroad and Saratoga street, in Boston, the Eastern Railroad Company has been accustomed to maintain a flagman upon an understanding between the Eastern Company and the Boston & Albany Railroad Company, using the same track, that the Eastern flagman shall watch the track and give notice when any locomotives and cars of either company are about to cross. Some of the trains have been accustomed, at this spot, to pass unbroken, others to make a flying switch. A train of the Boston & Albany road approached the spot, but the men on board neglected to make the proper signal for a flying switch, although one was intended. The flagman, missing the signal, supposed that the engine and cars which passed him were the entire train; as they passed he therefore rolled up his flag and walked along the track toward his resting place. Meantime the detached portion of the train came up behind him, with slackening speed, and he was run over and hurt. He sued the Boston & Albany Company; but the Court adjudged the accident to have been his own fault, because he should have observed the coming cars. There was nothing to prevent his perceiving, had he looked and listened as a person on a railroad track should always do, that there were some detached cars coming from the rear. His inattention precluded him from complaining that the trainmen were negligent in omitting the signal.

Contributive Negligence of Person Crossing Track.—A dozen opinions of courts are published every year saying, emphatically, that whoever assumes to cross a railroad track, even at a rightful highway crossing, is bound to look and listen for any approaching train; and that if he omits to do so and is run over, it is his own fault.

"In this state," says Chief Justice Church, of the New York Court of Appeals in a case decided last year, "it has been settled that a person desiring to cross a railroad track must exercise his senses of seeing and hearing to avoid danger, and an omission to do this has frequently been adjudged, as a matter of law, negligence. The traveler must look both ways and listen for the approach of trains. He is not obliged, however, as matter of law, to stop his team, to rise up in his wagon, or to get out and go to the track and make observations. Whether he ought to do any or all of these things in a given case, in order to relieve himself from a charge of negligence, is for the jury to decide in view of the circumstances developed. Care must be exercised commensurate with the danger to which a party is exposed, but the degree of care necessary to be exercised on a particular occasion is, generally, of necessity, a question of fact."

Case after case is found in which this simple principle is disregarded. The companies are constantly harassed with suits which, if the plaintiff had been properly interrogated by his own lawyer before suing: "Did you look and listen for the engine before you stepped (or drove) on the track?" and had frankly and truthfully answered the question according to the facts as afterward clearly proved: "No, I did not,"

the suit would never have been brought. Exceptional and doubtful cases sometimes occur, but they are rare. In one or two recent ones the traveler admitted that he did not look and listen, but it was shown that the road was so constructed, there were such intervening trees, banks of earth, etc., or other obstructions, or such lack of signals, that looking or listening would not have enabled him to detect the approach of the train in season to do any good; and the courts say that the uselessness of the precautions may excuse the omission to take them.

Imputation of Negligence.—Doubtful cases arise, though none are noticed in the reports of the last few months, where a child plays upon the track for want of watchfulness of his proper guardians; or in which a guest or lady riding in a carriage is hurt through neglect by the driver of the team to exercise proper attention. The courts are not agreed how far the right of recovery in behalf of a little child is to be decided by ascertaining whether the victim was careless for a child, or whether the negligence of the guardian is imputable to the ward. As to cases of one person treating another to a ride, the current of opinion is that the guest is not chargeable with the negligence of the driver.

The Winter Wheat Line.

The Illinois State Department of Agriculture reports the acreage and condition of the winter wheat crop in that state as existing May 2, which is interesting as showing the distribution of the acreage of this crop as well as the condition. By this report there were 3,049,631 acres of winter wheat in the whole state, of which only 36,264 acres, whose condition was 69 per cent. of an average, were in the northern 23 counties (1,577 acres per county); 1,036,801 acres, whose condition was 62 per cent. of an average, were in the central 38 counties (27,284 acres per county); and 1,976,566 acres, whose condition was 77 per cent. of an average in the southern 41 counties (25,070 acres per county). This makes the condition of the whole acreage of the state 28½ per cent. below an average.

The northern line of the winter wheat district is pretty distinctly marked, but it is considerably south of the "Northern Grand Division" of the State Agricultural Department, as its own report of the acreage in each county shows. Eleven of the northernmost counties of its "Central Grand Division" have an acreage of but 2,284 acres per county, and if we divide the state with these counties to the north and all the rest to the south we shall have:

North 34 counties have 61,381 acres = 1,805 per county.
South 68 counties have 2,988,250 acres = 43,945 per county.

That is, there are twenty-four times as many acres of winter wheat per county in the southern as in the northern section. Plainly speaking, the winter wheat crop in the northern portion of the state is altogether insignificant. With an average yield it would be no more than a single day's receipts of grain sometimes are in Chicago or New York. There are six different counties in Central Illinois which have each more acres of winter wheat than the whole 34 of Northern Illinois, and four counties in Southern Illinois (Macoupin, Madison, Montgomery and St. Clair), that have each twice the acreage of these 34 northern counties.

The northern line of the winter wheat district is very near by that of the Lake Erie & Western Railroad from the Indiana line near Hoopston nearly due west to Bloomington, and thence further west through Peoria to the Mississippi, a little south of Burlington. To show how abrupt the division is, we give the winter wheat acreage this year in the adjacent counties north and south of this line.

| North. | Acre. | Acre. | South. |
|-----------------|--------|---------|-------------|
| Iroquois..... | 4,781 | 68,549 | Vermillion. |
| Ford..... | 295 | 23,851 | Champaign. |
| Livingston..... | 321 | | |
| Woodford..... | 3,631 | 12,449 | McLean. |
| Peoria..... | 5,137 | 22,014 | Tazewell. |
| Knox..... | 5,286 | 32,390 | Fulton. |
| Warren..... | 1,061 | 9,569 | McDonough. |
| Henderson..... | 3,542 | 27,114 | Hancock. |
| Total..... | 24,054 | 185,936 | |

The southern tier of counties though one less in number, owing to a westward bend of the Mississippi have a larger area, probably nearly equal to that of the whole county of Hancock; but allowing for that we have 24,000 acres of winter wheat in one row of counties from the Indiana westward across the state to the Mississippi, and 169,000 acres, or seven times as much, in the adjacent belt of equal area on the south. In the part of the country north of this line success or failure of the winter wheat crop has very little effect on the amount of traffic it furnishes to the railroads. In this northern district are all the Illinois lines of the Rock Island road, all but a little of the Burlington, and about half of the Chicago & Alton's mileage. In the southern or winter-wheat district are the whole of the Indiana, Bloomington & Western, and all of the Wabash's Illinois lines except the Toledo, Peoria & Warsaw, the western half of which, however, dips into the winter wheat belt.

This establishes the winter wheat line in Illinois very distinctly; it does not extend far east of Illinois, however. Not much winter wheat is grown in Northern Indiana, but Michigan grows winter wheat almost exclusively. Westward, however, the Illinois winter wheat line does extend, though perhaps not due west and probably not so sharply defined. Missouri grows winter wheat chiefly and so does Kansas, though the latter also produces considerable spring wheat some years. Nebraska grows spring wheat almost

exclusively, and Iowa's production is chiefly of that grain, though winter wheat is produced to some extent—where and how largely we cannot say precisely. Its southern tier of counties are on the same line with the northern tier of winter wheat counties in Illinois.

In all the territory further north the production of winter wheat is, on the whole, insignificant, though it is sown to some extent in various limited districts in Wisconsin and Southern Minnesota. But an overwhelmingly large proportion of the wheat grown in this northern district is spring grain, which shows the absurdity of the talk last winter and spring on the great damage to the "granger" roads by the winter-killing of the wheat. There is, however, a considerable belt between the country where winter wheat is a leading crop and that where spring wheat is the leading crop, and in this belt wheat is not a very important crop, though what is grown is chiefly spring wheat. Thus the whole wheat production of these 34 northern counties of Illinois last year was but about 2,800,000 bushels. The production in the corresponding belt in Iowa is much more important, but not so great in proportion as in Northern Iowa.

All this is important in judging of the effect of the success or failure of different crops on the traffic of the several railroads. A failure of winter wheat will benefit rather than injure such roads as the Chicago & Northwestern, the Chicago, Milwaukee & St. Paul, the St. Paul, Minneapolis & Manitoba, the Chicago, St. Paul, Minneapolis & Omaha; and a failure of spring wheat will trouble very little the greater part of the Wabash lines, the Indianapolis & St. Louis, the Vandalia Line, the Ohio & Mississippi, etc., and the lines due west from Chicago will not have a very great decline in their local freight if both winter and spring wheat turn out badly.

Crop Prospects.

The crop prospects at this season command a great deal of attention. Less information has been obtained for winter wheat than might have been expected, but what there is indicates that the crop of this grain, which for four successive years has been unusually good, will be inferior this year. In Ohio the best authority estimates the stand as 15 per cent. less than last year's. In Michigan, much damage has been done, and the yield is not expected to be as large by one-third or more as the magnificent crop of last year. The State Agricultural Department of Illinois has reported the acreage and condition of winter wheat in each county May 2 last, the aggregate showing a condition 28½ per cent. below an average, while the acreage was 2½ per cent. larger than last year, when the crop in Illinois was the largest ever known, and larger than the wheat crop of any other state has ever been. We see no recent report from Indiana, but a month or more ago the condition of the wheat was reported bad. In Kansas the crop is very promising, and it was poor there last year.

As to spring wheat, the season was so very late that farmers are barely through sowing yet. There is, however, plenty of time for wheat to mature all over the country and make a good crop, should the weather be favorable, as it has been since the snow disappeared. The lateness of the season is likely to be felt more in limiting the area that can be sown. Farmers, like other people, usually keep that force of teams, tools and labor that will barely suffice to do all their work in ordinary seasons; and when the season has been shortened by frost or rain, so that they have to do their plowing and sowing and planting in fewer days than usual, they are not able to do so much of it. Doubtless this will have a good deal of effect, but there were so many new farmers and such preparations for cultivating a great deal more than usual that it may well be that as much will be sown as last year. One investigator reports an increased acreage in Minnesota, Dakota and Nebraska, and another, a decrease of 10 per cent. in the aggregate of the spring-wheat acreage. This crop of course has still to meet all the dangers incident to germination, growth and harvest yet, as it has every year; but we do not see why it is not now as likely as in any year to turn out a good crop.

The lateness of the season, which has prevented the farmers from sowing to wheat land which they had intended to devote to that crop, will tend to increase the area planted to corn, which can be put in when it is too late to sow wheat, but the long winter will inevitably lessen the amount of agricultural work that can be done this year, and, strange as it may seem, will probably have a very decided effect on the area cultivated next year. In all prairie countries farms are brought into cultivation gradually, and the farmer usually tries to increase his plow-land yearly by "breaking" some of the wild prairie. This can only be done in the spring and early summer, and is usually done after corn-planting, first because the farmers generally can spare their time and teams then (especially if they grow small grains chiefly), and next, because then the wild grass is most thoroughly killed. But in a season when spring plowing hardly began before May, and corn-planting will go on well into June, not much breaking can be done.

The prospect for the carriers then is that there will be decidedly less winter wheat this year, and this will affect chiefly the railroads in Michigan, Ohio and the lines in Illinois and Indiana south of Lafayette, Bloomington, Peoria and Burlington. All this country for four successive years has had magnificent crops of winter wheat, and this has induced a great increase in the area sown; and it is here (and on the Pacific coast) that the increase of wheat production has been greatest of late years, and not west of the Mississippi, still less west of the Missouri. Three counties in Illinois last year produced about as much wheat as the whole state of Nebraska

(where the crop was unusually poor, however), and half as much as Kansas; and the four states of Ohio, Michigan, Indiana and Illinois produced more than 160,000,000 bushels, which must be about 100,000,000 bushels more than their consumption for food and seed, and our total exports in 1880 were but about 152,000,000 (including flour). Another effect of a smaller yield in this great winter-wheat district will be to make the midsummer grain movement, which has been extraordinary for two or three years, lighter. Formerly there usually was not a heavy grain movement until September or the latter part of August; but last year the receipts of the Northwestern markets in the last week of July were the largest of the year, and for two or three years past shipments of the new crop on a large scale may be said to have begun in the first half of July.

Foreign Railroad Notes.

Wurtemberg unites the operation and inspection of all the transportation enterprises of the state, including railroads, steamboats on the Lake of Constance, mails and telegraphs, under its Minister of Foreign Affairs, which seems a strange choice; but, as Wurtemberg is part of the German Empire, its Minister of Foreign Affairs can hardly have much more to do than the foreign minister of Ohio, say, if there was such an officer.

There seems to be considerable danger of getting one's fingers pinched by the doors of the European railroad cars that are entered at the sides. In one week a list of patents issued at Berlin has notice of two different patents to prevent it.

The statistician of the Taragona Railroad Company has published statistics of the Spanish railroads, by which it appears that in 1879 there were 4,189 miles of railroad in operation in Spain, in 40 different lines, worked by 25 different companies. On these roads during the year 14,115,268 passengers and 6,425,655 tons of freight were carried, and their total earnings were \$26,344,405, or at the average rate of \$6.288 per mile, which is not far from the average receipt of the roads of this country. There is one company (the Spanish Northern) with 1,077 miles of road, one with 958, but no other with as much as 400 miles. One of the roads (next to the longest) earns very nearly \$44,800 per mile, while the longest system earns \$32,700 per mile. On the other hand, there are roads whose earnings per mile are but \$590, \$815 and \$1,597.

At the close of 1879, according to the official reports, there were 5,112 miles of railroad in operation in Italy, with 1,492 locomotives, 4,544 passenger cars and 24,093 freight cars. The roads had cost at the average rate of \$95,706 per mile, of which \$8,504 were for equipment. Their average earnings per mile in 1879 were \$6,159 per mile—a little less than the average in this country—and their working expenses \$3,780 per mile, leaving as net earnings \$2,379, which is at the rate of 2.5 per cent. (nearly) on the capital invested. The earnings from passengers were very nearly as great as the ordinary freight earnings, but a very large amount—nearly an eighth of the total earnings—were from the express and other freight carried on passenger trains. The average earnings per train-mile were \$1.54, and the expenses 94½ cents.

On this comparatively small system of railroads, there were in the course of the year 256 collisions and 400 derailments of trains, by which 29 persons were killed and 439 injured.

Italy has adopted street railroads (mostly worked by steam), in the place of ordinary railroads to a very great extent. At the close of 1879 573 miles were in operation (of which 503 miles were worked by steam), while 106 miles were under construction and charters were granted for 737 miles more. Of the 843 miles not yet completed it was intended to work all but 25 miles with locomotives.

Record of New Railroad Construction.

This number of the *Railroad Gazette* contains information of the laying of track on new railroads as follows:

Missouri Pacific.—The track of the Lexington & Southern Division is extended from Nevada, Mo., southward 20 miles.

Missouri, Kansas & Texas.—On the Southeastern Extension track is laid from Greenville, Tex., south by east 33 miles. On the Southwestern Extension track has been extended from Denton, Tex., to Ft. Worth, 32 miles. The last-named line is owned jointly with the Texas & Pacific.

St. Louis & San Francisco.—The Arkansas Division is extended from Seligman, Mo., south by west to Benton, Ark., 20 miles.

New Orleans Pacific.—Extended from Donaldsonville, La., northwest to Plaquemine, 15 miles.

Chester & Lenoir.—Extended from the Catawba River northward to Lincolnton, N. C., 10 miles. Gauge, 3 feet.

Elizabeth City & Norfolk.—Completed by laying track from a point five miles north of Elizabeth City, N. C., north to a point seven miles south of Norfolk, Va., 32 miles.

Oregon Railway & Navigation Co.—This company's Dalles & Wallula line has been completed by laying 30 miles of track.

This is a total of 192 miles of road, making 1,210 miles this year, against 1,330 miles at the corresponding time in 1880, 562 miles in 1879, 312 miles in 1878 and 365 miles in 1877.

NEW YORK, LAKE ERIE & WESTERN EARNINGS have been reported for the month of March, showing an increase of 12½ per cent. over the March earnings last year; but the expenses increased nearly 27 per cent., and more in amount than the earnings, so that there was a decrease of about \$39,000, or 5¼ per cent. in net earnings. Other trunk lines show the following results for this month: the New York

Central a decrease of \$186,585, or 15.4 per cent.; the Pennsylvania an increase of \$566,118, or 17.2 per cent.; the Northern Central an increase of \$37,582, or 9 per cent.

The Erie's gross earnings, expenses and net earnings in March for four successive years have been:

| | 1878. | 1879. | 1880. | 1881. |
|-------------------|-------------|-------------|-------------|-------------|
| Gross earnings... | \$1,147,208 | \$1,356,780 | \$1,644,958 | \$1,847,261 |
| Expenses..... | 825,370 | 945,006 | 902,026 | 1,143,258 |
| Net earnings... | \$321,838 | \$411,774 | \$742,932 | \$704,003 |

Thus comparison with the years previous to 1880 is exceedingly favorable, and in all comparisons of this road's earnings and profits we should bear in mind that its progress in 1880 was extraordinarily great, even in that year of general great progress. This year in comparison with 1879 there is an increase of 36 per cent. in gross and of 21 per cent. in net earnings. The expenses were increased this year by unfavorable weather; but for that the increase in them would probably not have been larger in proportion than the increase in earnings, in which case there would have been an increase of \$92,000 instead of the actual decrease of \$39,000 in net earnings.

For the six months of this company's fiscal year ending with March, the comparison with the previous year shows an increase of 15 per cent. in gross earnings, an increase of 15.1 per cent. in working expenses, and of 14.6 per cent. in net earnings. The latter ought to be considered a very satisfactory increase, but to those who based their calculations for this year on the extraordinary gains of 50 to 100 per cent. last year, it is doubtless disappointing. But during these six months while the Erie's earnings have increased 15 per cent., the Pennsylvania's have increased but 8½ per cent., and the New York Central's but one-fifth of 1 per cent.; and while the Erie's net earnings have increased 14½ per cent., the Pennsylvania's have decreased 3½ per cent.

The figures for the six months for two years are:

| | Gross earnings. | Expenses. | Net earnings. |
|-------------------|--------------------|-------------|---------------|
| Erie..... | 1881. \$10,140,499 | \$6,635,150 | \$3,505,350 |
| | 1880.. 8,821,334 | 5,762,315 | 3,059,019 |
| New York Central. | 1881.. 16,342,508 | | |
| | 1880.. 16,312,310 | | |
| Pennsylvania..... | 1881.. 21,134,591 | 12,791,881 | 8,372,710 |
| | 1880.. 19,410,382 | 10,756,424 | 8,653,958 |

The progress made on the Erie during the half-year for four successive years is shown below:

| | 1878. | 1879. | 1880. | 1881. |
|-------------------|-------------|-------------|-------------|--------------|
| Gross earnings... | \$8,144,057 | \$7,772,022 | \$8,821,334 | \$10,140,499 |
| Expenses..... | 5,487,263 | 5,458,407 | 5,762,315 | 6,635,150 |
| Net earnings... | \$2,656,794 | \$2,313,525 | \$3,059,019 | \$3,505,350 |

The increase in net earnings, which is but 14.6 per cent. over last year, is 51½ per cent. over the net earnings in the corresponding half-year of 1878-79, and 32 per cent. over those of 1877-78. The increase over last year is equivalent to nearly 5½ per cent. on the preferred stock of the company.

LAKE RATES have been unusually steady during the two weeks that navigation has been open. Down to last Monday the fluctuations had amounted to no more than a quarter of a cent a bushel, from 5½ cents down to 5¼ for wheat from Chicago to Buffalo, with corn about half a cent lower. A large grain fleet arrived at Chicago Sunday, and thereupon the rates fell, and quotations Tuesday were 4½ to 5 cents for wheat and 4¼ to 4½ for corn. The rate asked on the canal at the opening was 7 cents a bushel for wheat from Buffalo to New York—the same as last year. With this rate and the Buffalo transfer charge the cost by lake and canal from Chicago to New York is about 13½ cents, the all-rail rate being 18 cents. Last year about this time (it being six weeks after the opening of the lakes), the lake-and-canal rate amounted to but about 10½ cents, and yet the 30-cent rail rate was maintained. Ocean rates have advanced during the week from 1¼d. to 2¼d. by steam from New York to Liverpool, but the latter is an extremely low rate.

GEORGE STEPHENSON'S CENTENARY will be celebrated at Newcastle-on-Tyne, June 9 next, the one hundredth anniversary of his birth; and the Mayor of that city has telegraphed to this country an invitation for Americans to attend. The event will not, however, command that attention which was given to the fiftieth anniversary of the opening of the Stockton & Darlington Railroad, in 1825, or of the Rainhill trial last year. It is an occasion, however, worthy of the highest poetry and eloquence, and it would be seemly if steps should be taken in this country on this occasion to provide some memorial of the genius of the great engineer, by which the United States have been benefited more than any other nation—which alone has made possible our rapid growth in population and prosperity. It is not at all creditable that in a country which his invention has so vastly profited, and where in connection with it many vast private fortunes have been created, there should be no monument to his memory.

THE CHICAGO SWITCHMEN'S STRIKE seems virtually ended, not by the yielding of the switchmen, who generally seem to have held out to the last, but by their replacement by other men, the possibility of doing which is the best evidence that the present demand for that kind of work does not warrant the wages claimed by the switchmen. Indeed, the latter, \$2.75 and \$3 per day, seem unusually high for such an occupation, usually counted unskilled, but certainly one of the most dangerous known. The railroads granted an advance which makes the monthly wages \$65 to \$75 per month, we believe. The men in their public meetings counselled good order and no violence, but a large number of them did not follow their own advice, but for some days made it impossible to dispatch freight trains by following trains as they were being made up by coupling out coupling pins, and the like, and receipts and shipments at Chicago almost ceased for some days.

General Railroad News.

MEETINGS AND ANNOUNCEMENTS.

Meetings.

Meetings will be held as follows:
Oregon Railway & Navigation Co., annual meeting, in Portland, Or., June 20. Transfer books closed May 20.
Pacific Mail Steamship Co., annual meeting, at the office in New York, May 25.
Pennsylvania Coal Co., annual meeting, in Hawley, Pa., June 14.
Illinois Central, annual meeting, at the office in Chicago, May 25, at noon.

Technical Conventions.

The Car Accountants' Association will hold its annual convention at the Grand Hotel in Cincinnati, May 25.
The Master Mechanics' Association will hold its fourteenth annual convention in Providence, R. I., beginning Tuesday, June 14. Headquarters for members will be at Narragansett Hotel.
The Master Car-Builders' Association will hold its fifteenth annual convention in the city of New York, beginning June 14.
The American Society of Civil Engineers will hold its thirtieth annual convention in Montreal, Canada, beginning June 15.

Dividends.

Dividends have been declared as follows:
Northern (New Hampshire), 2 per cent., semi-annual, payable June 1.
Delaware & Hudson Canal, 1½ per cent., quarterly, payable June 10. This is the first dividend for several years.
Danbury & Norwalk, ¼ per cent., quarterly, payable June 1.

ELECTIONS AND APPOINTMENTS.

Augusta & Knoxville.—At the annual meeting in Augusta, Ga., recently, the following directors were chosen: F. F. Verdery, P. H. Bradley, R. H. May, Z. McCord, J. H. Alexander, J. V. H. Allen, Charles Estes, W. B. Young, M. A. Stovall, W. C. Sibley, J. W. Clark, H. Franklin, R. H. Middleton, J. C. Maxwell, C. M. Burkhalter, A. M. Aiken, J. D. Neil, T. F. Riley. The board elected F. F. Verdery President; P. H. Bradley, Vice-President.

Atlantic & Northwestern.—The directors of this company are: Joseph H. Miller, H. J. Samuels, of West Virginia; H. K. Ellyson, H. C. Parsons, Otis H. Russell, H. D. Whitcomb, Richmond, Va.; Wm. Walter Phelps, New York; George M. Bartholemew, Hartford, Conn.; Cyrus H. McCormick, Jr., Chicago. The board elected H. J. C. Parsons President; Thomas Ewing, Counselor. Mr. Parsons is also President of the Richmond & Allegheny Company.

Buffalo, New York & Philadelphia.—Mr. E. T. Johnson, General Freight Agent, has been relieved from duty as Agent in Buffalo, and will hereafter be General Freight Agent only. Mr. James T. Gardner, late Chief Operator, has been appointed Assistant Superintendent.

Canada Central.—The following circular from General Manager Archer Baker is dated Brockville, May 16:

"Mr. J. A. Houston has been appointed General Freight and Passenger Agent of this company, to take effect from above date. His headquarters will be at Brockville, Ont., until further notice. All correspondence as to freight and passenger rates, etc., must be addressed to him as above. Over and short reports, tracer-sheets, claims and all communications in reference thereto, must be sent in to him, and in all matters pertaining to his department his instructions and orders must be respected and obeyed by all employees."

Cedar Rapids, Sigourney & Ottumwa.—At the annual meeting in Cedar Rapids, May 10, the following directors were chosen: T. C. Cunningham, S. Horned, E. Laffler, C. H. Mackey, J. M. Morrison, G. G. Woodin, J. P. Yerger, Sigourney, Ia.; P. G. Ballingall, Charles F. Blake, Samuel A. Flagler, Ia.; M. Hedrick, W. T. Harper, G. A. Madison, J. L. Taylor, Ottumwa, Ia.; George Douglas, M. A. Higley, N. M. Hubbard, E. S. Mansfield, F. J. Upton, W. W. Walker, John Wear, Cedar Rapids, Ia. The board elected J. M. Hedrick, President; N. M. Hubbard, Vice-President; S. L. Fonda, Secretary; M. A. Higley, Treasurer.

Cheshire.—At the annual meeting in Keene, N. H., May 11, the following directors were chosen: Edward C. Thayer, Keene, N. H.; James H. Williams, Bellows Falls, Vt.; Ephraim Murdock, Jr., Winchendon, Mass.; Wm. A. Russell, Lawrence, Mass.; Samuel Gould, John B. Meer, George F. Williams, Boston. There is no change from last year.

Chicago, Burlington & Quincy.—Mr. Percival Lowell has been appointed General Passenger and Ticket Agent, in place of Mr. James R. Wood, who has gone to the Pennsylvania Railroad. Mr. Lowell has been for seven or eight years with the Burlington & Missouri River in Nebraska; he has been General Freight and Ticket Agent of that road for several years, and for a year past Assistant General Manager also.

Mr. E. J. Swords has been appointed General Western Agent, with office in Denver, Col.

Chicago & Grand Trunk.—The following circular announces officially some changes we have already noted:

"Mr. S. R. Callaway is appointed General Superintendent of the Chicago & Grand Trunk Railway, with headquarters at Chicago.

"Mr. C. B. Beck undertakes the duties of Traffic Manager, being charged with the management of both the freight and passenger business of the company. Mr. Beck's headquarters will be, as now, at Port Huron.

"The office of General Manager is abolished. These appointments will take effect on and after Monday, May 16."

Connott Valley.—At the annual meeting, May 11, the following directors were chosen: Edward D. Bishop, W. A. Lynch, Arthur B. Proal, Augustus Thierry, L. A. Tressel, Canton, O.; Isaac H. Taylor, Carrollton, O.; Samuel Allen, Dell Roy, O.; Samuel Watts, Thomaston, Me.; Cyrus Wakefield, Wakefield, Mass.; Wm. J. Rotch, New Bedford, Mass.; Albert P. Clarke, Albert W. Nickerson, Joseph B. Thomas, Boston. They met May 13 and elected Wm. J. Rotch, President; Samuel Allen, Vice-President; Arthur B. Proal, Secretary and Treasurer; C. G. Patterson, General Manager; W. F. Ellis, Chief Engineer; W. A. Lynch, Counsel.

Des Moines & Kansas City.—This new company has elected the following directors: J. H. Blair, H. E. J. Boardman, T. E. Brown, Charles J. Jones, Wm. M. Jones, Samuel Merrill. The board elected Wm. M. Jones President; H. E. J. Boardman, Vice-President; Charles J. Jones, Secretary; T. E. Brown, Treasurer. Office in Des Moines, Iowa.

Detroit, Lansing & Northern.—At the annual meeting in Detroit, May 11, the old board was re-elected, as follows: Alpheus Hardy, Nathaniel Thayer, John A. Burnham, H. H. Hunnewell, George O. Shattuck, Charles L. Young, Charles

Merriam, Charles F. Adams, Jr., Nathaniel Thayer, Jr., James H. Blake, Alpheus H. Hardy, all of Boston.

Eastern, in New Hampshire.—At the recent annual meeting the following directors were chosen: Edward A. Abbott, Moody Currier, Edward L. Giddings, Wm. H. Goodwin, Frank A. Philbrick, Dexter Richards, Francis Thompson. The board re-elected Moody Currier President; Wm. H. Hackett, Clerk. The road is leased to the Eastern Company.

Hannibal & St. Joseph.—Mr. E. J. Swords has been appointed General Western agent, with office in Denver, Col.

Illinois & Indiana.—The directors of this new company are: H. Altman, Wm. Burdon, R. B. Caldwell, E. B. Crum, J. M. Hurlbert, Wm. J. Leddell, John B. Thompson.

Indianapolis & Vincennes.—At the annual meeting in Indianapolis recently the following directors were chosen: Oran Perry, J. A. Perkins, Indianapolis; W. H. Barnes, J. N. McCullough, Thomas D. Messler, Wm. Thaw, Pittsburgh; George B. Roberts, Philadelphia.

Kent Northern.—At the annual meeting in Richibucto, N. B., May 4, the following directors were chosen: Robert Care, Martin Flanagan, Alexander Girvan, Robert Hutchinson, Henry O'Leary, Charles J. Sayre, John Taylor. The board elected Henry O'Leary President; J. D. Phinney, Secretary-Treasurer.

Little River Valley & Arkansas.—The old board having resigned, the following directors have been chosen: George D. Fisher, Oscar Kocitzky, Leonard Matthews, J. W. Paramore, A. M. Shead, A. C. Stewart. The board elected J. W. Paramore, President; J. H. Clark, Secretary; Oscar Kocitzky, Superintendent. Messrs. Shead and Kocitzky are old officers; the other directors represent the Texas & St. Louis Company, which now controls the road.

Lookout Mountain.—At the annual meeting in Chattanooga last week the following directors were chosen: C. C. Cleghorn, Summerville, Ga.; J. C. Warshaw, LaFayette, Ga.; John L. Divine, J. M. Lee, J. T. Wilder, Crawfish Springs, Ga.; D. G. Printup, J. C. Vance, Rome, Ga. The board elected J. C. Vance President; D. S. Printup, Vice-President; J. W. James, Secretary; D. C. McMillan, Treasurer.

Montreal & Vermont Junction.—At the yearly meeting in Stanbridge, P. Q., May 11, the following directors were chosen: J. S. Brigham, Jed. P. Clark, J. D. Hatch, A. H. Millmore, E. C. Smith, G. Smith, J. Gregory Smith. The road is controlled by the Central Vermont.

Morristown, Cumberland Gap & Ohio.—This company was organized at Morristown, Tenn., recently, by the election of the following directors: Thomas D. Fulkerson, J. C. Rogers, A. L. Snow, Claiborne County, Tenn.; James T. Shields, Thomas Tomlinson, Grainger County, Tenn.; George Folsom, A. H. Gregg, John Howell, O. C. Kink, C. D. Merrett, Wm. Van Huss, Hamblen County, Tenn. The board elected A. H. Gregg, President; O. C. Kink, Vice-President; J. C. Hodge, Secretary; R. E. Rice, Treasurer.

New York & Harlem.—At the annual meeting in New York, May 17, the following directors were chosen: James H. Banker, Samuel F. Barger, Abraham B. Bayles, John E. Burrill, Chauncey M. Depew, John B. Dutcher, Joseph Harker, Wm. H. Leonard, Robert J. Neven, Augustus Schell, Cornelius Vanderbilt, Wm. H. Vanderbilt, Wm. K. Vanderbilt. The road is leased to the New York Central & Hudson River Company.

New York, Lake Erie & Western.—Mr. C. C. Waite has been appointed Assistant to the President. Mr. Waite has been on the Pittsburgh, Cincinnati & St. Louis for a number of years. For nearly ten years he was Superintendent of the Cincinnati & Muskingum Valley Division, and last February was promoted to the Little Miami Division. Mr. Waite is a graduate of the Rensselaer Polytechnic Institute, of the class of 1864, and a member of the American Society of Civil Engineers; he is a son of Chief Justice Waite, of the United States Supreme Court.

Pensacola & Atlantic.—Mr. F. de Funiak has been chosen President and Consulting Engineer of this new company, in place of Mr. W. D. Chipley, who becomes Vice-President and General Superintendent of Construction. Gen. E. P. Alexander has been chosen a director, in place of T. T. Wright, resigned.

Pittsburgh, Cincinnati & St. Louis.—The board has elected George B. Roberts President; J. N. McCullough, First Vice-President; Wm. Thaw, Second Vice-President; Thomas D. Messler, Third Vice-President and Comptroller; S. B. Liggett, Secretary; Stephen W. White, Assistant Secretary; M. C. Spencer, Treasurer. Mr. Messler has been heretofore Assistant to the President.

Pittsburgh, Ft. Wayne & Chicago.—At the annual meeting in Pittsburgh, May 18, the following directors (one-fourth of the board) were chosen: Jesse L. Williams, Ft. Wayne, Ind.; Charles E. Spear, Pittsburgh; L. H. Myers, New York.

Pittsburgh Southern.—This company, at the recent annual meeting, elected James H. Hopkins President; J. P. Beal, John L. George, James W. Kuntz, F. P. Laughlin, J. W. Rowland, J. Wright, directors.

Pittsburgh & Western.—At the recent annual meeting the following were chosen: President, James Callery; directors, A. M. Brown, James D. Callery, John A. Caughey, George Chalfant, John W. Chalfant, John E. Downing, Charles Gibson, C. B. Herron, A. M. Marshall, H. W. Oliver, Jr., Jacob Painter, C. M. Passavant.

Roxboro.—The officers of this new company are: President, C. S. Winstead; Secretary, W. E. Webb; Treasurer, Thomas H. Street. Office at Roxboro, Person County, N. C.

St. John Bridge & Railway Extension.—This company was organized at St. John, N. B., last week, by the election of the following directors: F. E. Barker, Thomas R. Jones, J. Murray Kay, John H. Parks, Robert Robinson, Charles Spear, Payson Tucker. The board elected Thomas R. Jones President; T. B. Robinson, Secretary; J. Murray Kay, Treasurer; F. E. Barker, Solicitor.

PERSONAL.

Judge Robert Ould has resigned his position as President of the Richmond, Fredericksburg & Potomac Company, to take effect June 1.

Mr. J. B. Hoxie, for five years past Master of Transportation of the East Tennessee, Virginia & Georgia, has resigned that position.

Mr. J. C. McMullin, General Manager of the Chicago & Alton road, has returned to Chicago after several months spent in Florida, much improved in health.

Mr. Hugh Spencer, Superintendent of the Eastern Divi-

sion of the Chicago, St. Paul, Minneapolis & Omaha line, was married May 11 to Miss Harrington, of Chicago.

—Mr. Robert Stewart has resigned the position as General Manager of the Peoria & Pekin Union Railroad, to which he was recently appointed, and the office has been abolished.

—Col. Thomas A. Scott is reported as very much better, having so far recovered from his recent paralytic stroke that he is able to walk about and has largely recovered his strength.

—Mr. Henry Chisholm, President of the Cleveland Rolling Mill Co., died in Cleveland, O., May 16. He had been connected with the iron and steel manufacture in Cleveland and Chicago for many years.

—Mr. A. A. Gaddis has resigned his position as General Manager of the Boston, Hoosac Tunnel & Western road, in order to devote his whole time to his duties as General Manager of the Ogdensburg & Lake Champlain road.

—It is reported that Col. E. T. D. Myers, General Superintendent of the Richmond, Fredericksburg & Potomac road, has been offered the presidency of the Petersburg Railroad as reorganized, and that he has accepted.

—Col. George Noble, late General Superintendent of the Texas & Pacific was presented at Marshall, Tex., May 9, with a valuable silver service by employees of the road, and also with a handsome silver set by citizens of Marshall.

—Mr. Wm. Musser, an old and respected citizen, died at his residence in Philadelphia, May 13. For many years he was a director of the Philadelphia, Germantown & Norristown, and twice declined the presidency of the company.

—Mr. M. F. Moore—not Moon, as a typographical error made it last week—formerly of the Locomotive Engine Safety Truck Co., has taken a position with the Edison Electric Light Co., as Chief of the Bureau of Isolated Lights.

—Mr. B. W. Wrenn, General Passenger Agent of the Western & Atlantic road, is Chief of the Department of Transportation of the Atlanta Cotton Exposition. Mr. Wrenn is an exceedingly capable and active officer, and will doubtless do the Exposition good service in a position for which he is well fitted.

—A telegram from Mexico says that on the 7th of May Dr. N. P. Sackrider, attached to the corps of engineers which went out last February under A. M. Wellington, became insane and killed two members of the party, a Mr. Jones, son of David Jones, of Titusville, Pa., and brother of Wyndham C. Jones, Chief Engineer of the Cleveland, Coshocton & Straitsville Railroad, and a Mr. Martin; and that afterward Sackrider was himself killed by the chief of the party.

TRAFFIC AND EARNINGS.

Railroad Earnings.

Earnings for various periods are reported as follows:

| Four months ending April 30: | | | | |
|-------------------------------|-------------|-------------|--------------|-------|
| | 1881. | 1880. | Inc. or Dec. | P. c. |
| Ala. Gt. Southern... | \$240,580 | \$199,801 | I. \$40,779 | 20.4 |
| At. Miss. & Ohio... | 687,200 | 637,343 | I. 49,857 | 7.8 |
| Cairo & St. L. | 140,212 | 116,035 | I. 24,177 | 19.9 |
| Cin., Ind. & St. L. & C. | 692,935 | 694,652 | D. 1,717 | 0.3 |
| Grand Trunk | 3,473,119 | 3,257,331 | I. 215,788 | 6.6 |
| Hann. & St. Jo. | 640,861 | 765,841 | D. 124,980 | 16.3 |
| Nash., Chatta. & St. Louis | 760,245 | 721,711 | I. 38,534 | 7.4 |
| Net earnings | 295,581 | | | |
| Three months ending March 31: | | | | |
| Bur. C. R. & No. | \$440,811 | \$537,813 | D. \$97,002 | 18.0 |
| Net earnings | 86,101 | 209,986 | D. 123,885 | 59.0 |
| Des Moines & Ft. D. | 68,378 | 65,053 | I. 3,325 | 5.1 |
| Net earnings | 5,523 | 22,512 | D. 16,989 | 83.0 |
| Louisville & Nash. | 2,568,583 | 1,863,083 | I. 705,500 | 38.0 |
| Net earnings | 811,907 | 820,295 | D. 8,388 | 1.0 |
| Mem. Pac. & No. | 57,049 | 54,638 | I. 2,411 | 4.4 |
| Net earnings | 10,223 | 9,224 | I. 999 | 10.8 |
| N. Y., Lake Erie & W. | 4,716,463 | 4,193,557 | I. 522,906 | 12.5 |
| Net earnings | 1,376,057 | 1,435,331 | D. 59,274 | 4.1 |
| Paducah & E'town. | 127,597 | 94,270 | I. 33,327 | 35.4 |
| Net earnings | 41,650 | 25,104 | I. 16,546 | 66.2 |
| St. L., Iron Mt. & So. | 1,835,750 | 1,497,738 | I. 338,012 | 22.5 |
| Net earnings | 542,349 | 591,759 | D. 49,410 | 8.3 |
| Month of March: | | | | |
| N. Y., Lake Erie & W. | \$1,847,261 | \$1,644,958 | I. \$202,303 | 12.3 |
| Net earnings | 704,093 | 742,931 | D. 38,838 | 5.2 |
| Month of April: | | | | |
| Ala. Gt. Southern | \$58,293 | \$45,344 | I. \$12,949 | 28.8 |
| At. Miss. & Ohio | 173,000 | 143,100 | I. 29,900 | 21.0 |
| Cairo & St. L. | 35,154 | 31,626 | I. 3,528 | 11.5 |
| Cin., Ind., St. L. & Chi. | 175,484 | 168,199 | I. 7,285 | 4.3 |
| Hann. & St. Jo. | 188,124 | 206,735 | D. 18,611 | 9.0 |
| Ind., Bloom. & West | 103,555 | 90,375 | I. 13,180 | 14.6 |
| Nash., Chatta. & St. Louis | 183,526 | 155,466 | I. 28,060 | 18.3 |
| Net earnings | 70,385 | | | |
| First week in May: | | | | |
| Chi. & Western Ill. | \$25,342 | \$29,481 | D. \$4,139 | 14.3 |
| Chi., Mil. & St. Paul. | 316,000 | 234,953 | I. 81,047 | 34.5 |
| Int. & Gt. Northern | 39,661 | 22,458 | I. 17,203 | 76.0 |
| St. L., Iron Mt. & So. | 110,300 | 98,892 | I. 11,408 | 11.5 |
| St. P., Minn. & Man. | 81,942 | 57,075 | I. 24,867 | 41.8 |
| Second week in May: | | | | |
| Northern Pacific | \$64,024 | \$49,138 | I. \$14,886 | 30.4 |
| Week ending May 6: | | | | |
| Gt. Western | \$107,690 | \$87,412 | I. \$20,278 | 23.3 |
| Week ending May 7: | | | | |
| Chi. & Grand Trunk | \$18,715 | \$14,897 | I. \$3,818 | 25.5 |

Grain Movement.

For the week ending May 7 receipts and shipments of grain of all kinds at the eight reporting Northwestern markets and receipts at the seven Atlantic ports have been, in bushels, for the past eight years:

| Northwestern | | Northwestern shipments | | Atlantic | |
|--------------|-----------|------------------------|-------------------------|-----------|--------|
| Year. | Receipts. | Total. | By rail. P. c. by rail. | Receipts. | Total. |
| 1874..... | 3,160,221 | 3,922,086 | 629,349 23.7 | 4,635,555 | |
| 1875..... | 2,536,565 | 3,478,238 | 1,236,079 35.6 | 1,642,615 | |
| 1876..... | 2,302,046 | 3,841,466 | 2,302,940 60.1 | 3,909,903 | |
| 1877..... | 2,853,906 | 2,525,207 | 1,214,861 48.1 | 2,684,629 | |
| 1878..... | 4,369,785 | 4,622,441 | 1,801,939 39.0 | 5,704,275 | |
| 1879..... | 3,539,093 | 4,175,308 | 1,994,849 47.9 | 4,450,571 | |
| 1880..... | 4,632,478 | 4,578,081 | 1,884,501 41.2 | 2,893,203 | |
| 1881..... | 3,706,023 | 4,974,840 | 1,503,111 30.2 | 3,100,544 | |

The receipts of Chicago during this week were reduced by the switchmen's strike, as were the rail shipments thence. The week was the first in which shipments were made by lake, the first cargo clearing May 4 from Chicago. Naturally, therefore, the shipments were the largest since navigation closed last November. The water shipments were 3,471,739 bushels, of which 365,895 went down the Mississippi, leaving about 3,106,000 bushels of lake shipments, against about 5,500,000 the first week that navigation opened last year. The rail shipments were but half as great as the week before, partly due to the opening of navigation, doubtless; but also partly to the switchmen's strike. Rail shipments have been so small but once before this year, but they are as large as the average rail shipments last year in April and May. The Atlantic receipts were

the smallest since the middle of February, and were 40 per cent. less than those of the previous week.

Of the northwestern receipts Chicago had 85.7 per cent., Toledo 19.4, Peoria 18.8, St. Louis 11.7; Milwaukee 6.8, Detroit 4.4, and Cleveland 3.2 per cent. The St. Louis receipts are not half as great as the week before and are the smallest since February; the Toledo receipts are 40 per cent. more than the week before and are the largest of the year.

Of the Atlantic receipts 44.3 per cent. were at New York, 15.6 at Baltimore, 14.8 at Boston, 11 at New Orleans, 7.9 at Philadelphia, 3.5 at Montreal, and 3 per cent. at Portland. The Baltimore receipts are the smallest since January, and the Philadelphia receipts with one exception are the smallest of the year; but then the total Atlantic receipts were the smallest since the first half of February.

Exports of flour and grain from Atlantic ports for five successive weeks have been:

| | | Week ending | | | | |
|--------------|-----------|-------------|-----------|-----------|-----------|-----------|
| | | May 11. | May 4. | April 27. | April 20. | April 13. |
| Flour, bbls. | 73,411 | 104,271 | 118,901 | 138,759 | 88,524 | |
| Grain, bush. | 3,371,309 | 2,397,558 | 3,117,793 | 3,528,623 | 4,091,384 | |

Thus there was a large increase last week in the grain exports over those of the preceding week.

For the week ending May 13 the receipts at the four leading Eastern ports were:

| | New York. | Boston. | Philadelphia. | Baltimore. |
|-----------|-----------|---------|---------------|------------|
| 1881..... | 1,752,759 | 324,100 | 303,650 | 285,039 |
| 1880..... | 3,608,874 | 188,991 | 547,700 | 281,175 |

Last year in this week were the first receipts at New York by canal, amounting to about 3,000,000 bushels. This year, a few weeks ago, there were some receipts by canal boats which were frozen in near Troy last November, and this year another fleet of boats arrived that were frozen in in the Eastern Division of the canal and released by its opening on the 12th; but boats clearing from Buffalo this year will not arrive at any time in May, the Western Division of the canal having been opened only last Tuesday.

Receipts and shipments of grain at Chicago and Milwaukee for the week ending May 13 were:

| | | Receipts. | | Shipments. | |
|----------------|-----------|-----------|-----------|------------|-------|
| | | 1881. | 1880. | 1881. | 1880. |
| Chicago..... | 1,318,144 | 3,116,644 | 1,915,893 | 2,708,910 | |
| Milwaukee..... | 236,367 | 329,200 | 279,123 | 433,500 | |

Receipts were nearly 60 per cent. less at Chicago and 28 per cent. less at Milwaukee this year than last, and shipments 20 per cent. less at Chicago and 35½ per cent. less at Milwaukee.

Receipts and exports of grain of all kinds and of flour and meal, reduced to equivalent bushels, from the four leading Eastern ports during the month of April were, in bushels:

| | | Receipts. | | Exports. | |
|-------------------|------------|-----------|------------|----------|-------|
| | | Bushels. | P. c. | Bushels. | P. c. |
| New York..... | 11,016,827 | 56.5 | 8,097,324 | 57.1 | |
| Boston..... | 3,441,936 | 17.6 | 1,788,893 | 12.6 | |
| Philadelphia..... | 1,716,509 | 8.8 | 1,348,504 | 9.5 | |
| Baltimore..... | 3,330,900 | 17.1 | 2,948,020 | 20.8 | |
| Total..... | 19,506,164 | 100.0 | 14,182,801 | 100.0 | |

San Francisco wheat exports for the ten months of the California crop year from July 1 to April 30 were as follows, flour reduced to wheat in the totals:

| | 1880-81. | 1879-80. | Increase. | P. c. |
|---------------------|------------|------------|-----------|-------|
| Flour, barrels..... | 530,298 | 422,681 | 107,617 | 25.5 |
| Wheat, bushels..... | 19,474,122 | 16,952,958 | 2,521,164 | 17.6 |
| Total, bushels..... | 22,598,612 | 17,076,363 | 5,522,249 | 32.5 |

China took nearly one-third of the flour, but 95 per cent. of the wheat went to Great Britain.

Shipments of California barley for the ten months of the crop year were: By sea, 480,684 centials; eastward by rail, 741,977 centials; total, 1,222,661 centials.

Barley is the only California grain which is sent east by rail to any extent.

Coal Movement.

Coal tonnages for the week ending May 7 are reported as follows:

| | 1881. | 1880. | Increase. | P. c. |
|------------------------|---------|---------|-----------|-------|
| Anthracite..... | 627,192 | 396,240 | 230,952 | 58.3 |
| Semi-bituminous..... | 100,434 | 71,688 | 28,746 | 40.1 |
| Bituminous, Penna..... | 46,208 | | | |
| Coke, Penna..... | 45,670 | | | |

The semi-bituminous trade is very active, especially in Clearfield, but prices are reported very low.

Chicago coal receipts for the four months ending April 30 were as follows:

| | | 1881. | | 1880. | |
|-----------------|--|----------|----------|----------|----------|
| | | By lake. | By rail. | By lake. | By rail. |
| Anthracite..... | | 215,457 | 50,892 | 154,348 | |
| Bituminous..... | | 684,834 | 34,087 | 574,402 | |
| Total..... | | 900,291 | 84,979 | 728,750 | |

There were no arrivals by lake this year until May 8. Shipments this year from Chicago were 215,164 tons.

The official accountant's statement of anthracite tonnages for April and the four months, differing somewhat in form from the weekly statements, is as follows:

| | | April. | | Four Months. | |
|-----------------------------|-----------|-----------|-----------|--------------|-------|
| | | 1881. | 1880. | 1881. | 1880. |
| Phila. & Reading..... | 480,692 | 531,709 | 1,805,010 | 1,698,229 | |
| Lehigh Valley..... | 403,682 | 387,101 | 1,598,318 | 1,236,272 | |
| Central, of New Jersey..... | 274,113 | 307,940 | 1,171,889 | 1,018,045 | |
| Del., Lacka. & Western..... | 286,483 | 279,440 | 1,278,837 | 1,082,108 | |
| Del. & Hudson Canal Co. | 197,193 | 228,481 | 961,473 | 898,119 | |
| Pennsylvania R. R. Co. | 187,674 | 136,550 | 628,754 | 444,524 | |
| Pennsylvania Coal Co. | 87,932 | 100,270 | 374,384 | 325,177 | |
| N. Y., Lake Erie & West'n | 28,156 | 37,140 | 143,851 | 120,924 | |
| Total..... | 1,945,855 | 2,016,640 | 7,962,516 | 6,824,398 | |

For the month the Lehigh Valley, the Delaware, Lackawanna & Western and the Pennsylvania Railroad show gains, the other companies falling off. All the companies show an increase for the four months. The total decrease for the month was 70,785 tons, or 3.5 per cent.; the increase for the four months, 1,185,118 tons, or 16.7 per cent.

The stock of coal on hand at tide-water shipping points April 30 was 528,198 tons, against 563,063 tons on March 31, a decrease of 34,865 tons, or 6.2 per cent.

Chicago and Milwaukee Receipts.

Receipts of grain, flour and hogs at Chicago and Milwaukee for the two weeks ending May 14 have been for four years:

| | | 1878. | | 1879. | | 1880. | | 1881. | |
|------------------|--|--------------|--------------|-----------|--------------|--------------|-----------|--------------|--------------|
| | | Grain, bush. | Flour, bbls. | Hogs, No. | Grain, bush. | Flour, bbls. | Hogs, No. | Grain, bush. | Flour, bbls. |
| Chicago..... | | 4,927,818 | 3,848,437 | 5,674,611 | 2,851,053 | | | | |
| Flour, bbls..... | | 116,708 | 128,930 | 113,781 | 105,286 | | | | |
| Hogs, No..... | | 155,273 | 192,249 | 252,378 | 217,785 | | | | |
| Milwaukee..... | | 1,513,079 | 1,044,712 | 636,073 | 487,512 | | | | |
| Flour, bbls..... | | 103,605 | 85,322 | 84,065 | 87,790 | | | | |
| Hogs, No..... | | 4,297 | 7,028 | 9,901 | 11,384 | | | | |

Thus at Chicago the receipts of grain were little more than half as great as in the corresponding two weeks of 1880, and the receipts of flour were less, while usually of late they have

been nearly twice as great. The receipts this year, however, have been abnormally small by reason of the switchmen's strike.

At Milwaukee the grain receipts were 23.3 per cent. less, and the flour receipts 4½ per cent. more than last year, but the grain receipts were 53 per cent. less than in 1879 and 67½ per cent. less than in 1878.

Montreal Grain Traffic.

Receipts and shipments of grain of all kinds and of flour at Montreal for the four months from Jan. 1 to April 30 are reported as follows:

| | 1878. | 1879. | 1880. | 1881. |
|------------------|-----------|-----------|---------|---------|
| Shipments: | | | | |
| Grain, bus..... | 1,459,668 | 1,236,706 | 906,860 | 927,790 |
| Flour, bbls..... | 138,223 | 106,071 | 85,607 | 103,627 |

| | 1878. | 1879. | 1880. | 1881. |
|------------------|-----------|-----------|-----------|-----------|
| Receipts: | | | | |
| Grain, bus..... | 1,542,671 | 1,433,131 | 1,423,533 | 1,158,108 |
| Flour, bbls..... | 231,883 | 214,116 | 144,616 | 224,589 |

| | 1878. | 1879. | 1880. | 1881. |
|---------------------------|-----------|-----------|-----------|-----------|
| Flour and grain, bus..... | 2,243,104 | 1,671,480 | 1,492,310 | 1,494,193 |

| | 1878. | 1879. | 1880. | 1881. |
|---------------------------|-----------|-----------|-----------|-----------|
| Flour and grain, bus..... | 2,876,922 | 2,459,094 | 2,229,948 | 2,273,800 |

In this statement grain in transit through Montreal must be counted as both receipts and shipments, which is no more proper than to count all the shipments over the New York Central as receipts and shipments at Schenectady. The regularly reported receipts of grain alone

Bridge Notes.

The Smith Bridge Company, of Toledo, O., has just finished a Howe-truss bridge, two spans of 140 ft. each, over the Mississinewa River at Marion, Ind., for the Cincinnati, Wabash & Michigan road.

The contract for a new bridge over the Hudson River at Albany, N. Y., has been awarded to Clarke, Reeves & Co., Phoenixville, Pa. The bridge will have a draw-span 400 ft. long, and two fixed spans of 253 ft. each, and will be a double-decked bridge, with two railroad tracks on the upper deck and a roadway for vehicles on the lower deck. There will also be two sidewalks outside the trusses.

Iron and Manufacturing Notes.

The Springfield Iron Co., in Springfield, Ill., made recently 1,900 tons of steel rails in one week, being the largest week's work ever done at this mill.

Neshannock Furnace, at New Castle, Pa., has gone out of blast to have a new lining put in.

The Whittier Machine Co., of Taunton, Mass., is building a heavy steam-riveting machine for the Hinkley Locomotive Co., of Boston.

Messrs. Greenwood & Hutchinson, of Columbus, O., inform us that the long-pending interference suits regarding the patents of John H. Greenwood for planing curved metal surfaces, have been decided in his favor.

Abrahams & Co., at Monongahela City, Pa., are building the engines and other machinery to operate the gates and locks at Lock No. 1 on the Monongahela River above Pittsburgh.

The Low Moor Iron Co. has bought the valuable iron property known as the Slack Ore Bank, in Allegheny County, Va. The bank will be connected with the Chesapeake & Ohio road by a spur 1½ miles long.

The Georgia Iron Works, at Atlanta, Ga., has been placed in the hands of Mr. Grant Wilkins as Receiver, on complaint of the bondholders and of the employees of the mill, who have claims for wages.

Rees & Thorn, of Pittsburgh, are building a double-hull steel pleasure steamboat, to be used on Saratoga Lake.

Mr. A. L. Griffin has been appointed General Manager of the Union Iron & Steel Co., of Chicago, in place of J. B. Stubbs, resigned.

The rolling mill of Magee & Co., at Brownsville, Pa., is running full time. A large steam hammer has lately been put up.

A company has been organized to build a rolling mill, machine shop and foundry in Staunton, Va., the capital stock to be \$500,000.

Fast Time by the Fontaine Engine.

The Detroit *Post and Tribune* thus describes the fast run made by the Fontaine engine over the Canada Southern road on May 5: "Thursday the Vanderbilt party left Detroit just before noon, drawn by the Fontaine engine, to go to Buffalo over the Canada Southern. The train consisted only of the special Vanderbilt car and one passenger coach. The uncouth form of the engine, with its driving wheels up in the air, has become familiar to the spectators at the depot, but there was quite a crowd in spite of the pouring rain, to see the railway magnet. The track to the Detroit Junction was clear, and the train pulled out with a rapidity that was somewhat unusual; but as everybody, including Mr. Fontaine himself, had said it was not probable any fast time would be made, no one expected anything astonishing. From Amherstburg to St. Thomas, 111 miles, the Canada Southern has the straightest stretch of track to be found anywhere, probably—just the place for a lively run. When Bishop Burgess came back from Europe, a few years ago, the special train he came on was pulled through in the unprecedented time—111 miles in 109 minutes; yet so smooth was the track that he and his associates did not know they were running particularly fast.

"Thursday, though the rain poured and the track was not what it will be later in the season, the time of the bishop's train was nicely beaten, and the run from Amherstburg to St. Thomas, 111 miles, made in 98 minutes, an average of nearly 68 miles an hour. One stop was made at Charing Cross for water. At 2.35, after a stop of 19 minutes, the race was again begun, and the run to Fort Erie, just this side the river from Buffalo, 118 miles from St. Thomas, made in 153 minutes, including five stops, estimated at 16 minutes. Thus, though the last 118 miles is over a road not nearly as straight as that between Amherstburg and St. Thomas, the whole run of 229 miles was made in 235 minutes."

OLD AND NEW ROADS.

Atlantic & Northwestern.—This company is a reorganization of the Guyandotte & Ohio River Mineral Company, and purposes building from the Virginia line along the New and Guyandotte rivers, in West Virginia, to the Ohio. The company controls large tracts of timber, coal and iron land, which will find an outlet over the road.

Austin & Northwestern.—This company has been organized to build a railroad from Austin, Tex., northwest to the Texas & Pacific in Taylor County, with a branch to the Rio Grande at a point not yet decided on.

Baltimore & Ohio.—This company has asked the city of Wheeling, W. Va., for the right of way through the city from its main line to the Wheeling, Pittsburgh & Baltimore Division. The iron-men have asked the City Council to ask for some concessions as to rates on coal and coke before granting the company's request.

The company has caused to be incorporated the Ohio & Baltimore Short Line Company, for the purpose of building the proposed extension of the Wheeling, Pittsburgh & Baltimore Division from Washington, Pa., to Connellsville on the Pittsburgh Division. The distance is 46 miles; part of it was graded seven or eight years ago.

Boston & Maine.—This company will build this season an extension of its Dover & Winnepesaukee Branch, from Alton Bay, N. H., along the south shore of Lake Winnepesaukee to Lake Village and Laconia, about 24 miles, provided the necessary authority can be obtained from the New Hampshire Legislature.

Brunswick & Albany.—The reported sale of this road to F. Wolff and others by the bondholders who now own it is confirmed. The purchasers say that they mean to extend the road from Albany, Ga., to Montgomery, Ala., running south of the Montgomery & Eufaula road. The purchasers are interested in the Alabama Great Southern and the Vicksburg & Meridian roads.

Cape Fear & Yadkin Valley.—The transfer of the franchises and partly graded road-bed of the Fayetteville & Florence road to this company has been completed. Work will be begun at once on the completion of the line from Fayetteville, N. C., southward to the South Carolina line.

Central Pacific.—A resolution introduced in the United States Senate by Mr. Saunders, of Nebraska, directs the Committee on the Judiciary to inquire into the reported diversion of business from the main line of this road to its leased lines, and especially into the relations of the company

"to its leased lines and other corporations, and especially those lines and corporations in which its stockholders are interested," and to report whether any action is necessary to protect the interests of the United States.

Chester & Lenoir.—Track is now laid to Lincolnton, N. C., 10 miles northward from last year's terminus at the Catawba River and 60 miles from the southern terminus at Chester, S. C. Work will be begun at once on the extension from Lincolnton northward.

Chicago & Eastern Illinois.—The reported purchase by this company of a controlling interest in the Evansville & Terre Haute road is confirmed. The company now controls the entire line from Chicago to Evansville. It is stated that the company will join with the Louisville & Nashville in the construction of a bridge over the Ohio at Evansville, which, with the extension of the Louisville & Nashville's line from Henderson to the bridge, will make a close connection between the two roads without the boat transfer of 10 miles now required.

Chicago, Rock Island & Pacific.—The St. Paul *Pioneer-Press* says: "The Chicago, Rock Island & Pacific Railroad, by its connection with the Burlington, Cedar Rapids & Northern route, at West Liberty, Ia., forms, in conjunction with the Minneapolis & St. Louis road, a first-class line between Minneapolis, St. Paul & Chicago. But in consideration of a contract for interchange of Omaha and Southwestern business with the Chicago, Milwaukee & St. Paul at Davenport, the Chicago, Rock Island & Pacific Company has refrained from using the line thus formed, down to the present time. But as the Chicago, Milwaukee & St. Paul Company is rapidly extending its line from Marion to Council Bluffs, the Chicago, Rock Island & Pacific folks claim, according to information obtained in an interview with a stockholder, that they are relieved from the agreement to keep out of Minneapolis and St. Paul. The same party, while averse to telling the story, or all that he knew, was induced by rigid inquiry to let drop the remark that it is understood the Chicago, Rock Island & Pacific Company is making active preparations to place itself in direct business relations with the great Northwest."

Chicago, St. Paul, Minneapolis & Omaha.—The deed transferring the St. Paul & Sioux City road and its branches to this company has finally been executed and recorded. It bears date May 9, and rehearses the terms of consolidation and the provisions of the act of the Minnesota Legislature authorizing the transfer.

Cincinnati, Indianapolis, St. Louis & Chicago.—At a meeting of the stockholders of this company in Indianapolis, May 16, it was voted to increase the capital stock from \$4,000,000 to \$6,000,000, the additional stock to be used to build an extension from Kankakee, Ill., to Seneca, to connect with the Chicago, Rock Island & Pacific road.

Cincinnati Southern.—The trustees have resolved to advertise for proposals for a lease of the road for 25 years, to be opened Aug. 18. Bidders will be requested to bid on each of three plans, as follows:

1. The payment of a percentage of the gross earnings as rental.
2. The payment of a fixed yearly rental to be graduated for different years of the lease.
3. A guarantee to the lessees of a certain interest on their capital, all net earnings over such interest to be paid over to the Trustees.

This action of the Trustees must be approved by the Sinking Fund Commissioners before it can take effect.

The Trustees have also resolved to receive bids for the purchase of the road, as well as for its lease.

Cleveland, Delphos & St. Louis.—This company was recently organized at Delphos, O., and a contract has been let for its construction from Delphos to Cleveland, about 150 miles. Contracts have also been made for the materials for fifty miles of the road.

Cumberland Valley.—It is understood that the extension from Martinsburg to Winchester, Va., will be built this season, provided that town and Frederick County will contribute \$50,000.

Dayton & Southeastern.—A recent report of the Referee to the Court shows that on March 12, 1881, the Receiver of this road had a balance of \$12,225.34 cash on hand. The total liabilities of the Receiver on that date were \$369,796.32; assets, \$15,256.06, showing an excess of liabilities of \$354,540.26.

Delaware & Hudson Canal.—It is reported that this company has under consideration the abandonment of its canal, or rather its conversion into a railroad, using the bed of the canal as a road bed for a double track. Last year and in one or two previous years much embarrassment was experienced from low water, the usual sources of supply not furnishing sufficient water to keep up navigation in the canal properly for nearly two months of the season.

Eastern.—The Boston *Traveller* gives the following statement of this company's plans for the current year:

"With all that has thus far been accomplished the work of improvement has in reality but just commenced. There is much yet to do, and the plans of the company for the year are only limited by the resources at its command. Its road, its rolling stock and its buildings are all to receive attention. Already 1,000 tons of steel rail have been purchased, and with this the two remaining miles of the main road will be relaid, and several of the branches also be put in a better condition. This work will be commenced within a very few weeks and prosecuted vigorously to completion. The construction of the Chelsea Beach track is a thing of the very near future, and it will in all probability be in operation by the first of June. This little branch will, it is expected, be a source of income of no small account, owing to the large increase in the beach patronage that is sure to be derived from it. It is an experiment that is bound to succeed to an extent that must be more than satisfactory to its most enthusiastic supporters.

"The patrons of the road are well aware of the desire and the willingness of the company to meet their comfort and convenience from what was done last summer in the additions made to the rolling stock, both on the White Mountain, Portland and local trains. This summer it is proposed to continue this good work by the addition of 12 elegant passenger coaches, which will also be divided up between the Portland, Gloucester, White Mountain and local trains. Four of these have already been turned out from the Salem shops; four more are nearly ready to come out, and four are in various stages of construction. These cars are being got up with especial reference to comfort and convenience, and the very best of material is being used in them. They are each to be 53 ft. long, and will seat 70 passengers. The finish will be in black walnut and the window sashes will be of solid mahogany. The windows will be of the observation style, and, unlike those in general use, will be weighted, so that they will, at all times, open and close readily. The shades will be of the drawing-room car style, and will be of fine brown curtain stuff, with morocco

trimmings, spring fixtures, and of elegant design. The clear-story in each car will be plainly but richly finished, all the old-time gaudiness of decoration being dispensed with. The ventilation will be perfect, and the seats of an improved pattern, 1½ inches lower than those in the cars put on last summer, it having been found that this is necessary in order to secure perfect comfort. The outside will be painted a dark yellow color, darker than heretofore, while the roof will be all white with the object in view of shedding the heat as much as possible. The steps will be somewhat lower than those on all of the old cars, and many other minor improvements will also be made. The cost of each will be nearly \$4,000, and when completed they will be among the finest of their kind on any road entering Boston.

"Other work is, also, in active progress at the Salem shops, among which is the construction of two baggage cars and extensive repairs on a large number of passenger and freight cars. Fifty-three flat cars have already been turned out at the shops and put into service to meet the constantly increasing demand on the company's freight facilities.

"The removal of the machine shops from East Boston, in order to enlarge the freight yard there and better the wharfage facilities, is a subject that has long been under contemplation, and, with reference to which, there have in the past been given to the public many unauthenticated reports. The company has not yet decided as to the location of these shops. Salem has been talked of, but no sooner did this become known than the citizens of Lynn, Chelsea, Revere and Ipswich all expressed a desire to have them, and in several cases offered large inducements to secure them; but Salem was not behind them in this respect, and its City Council took official action, and sent in their request to the managers, who now have the matter under consideration, though it is likely that the change will not be made for a year or more.

"Three new locomotives, built by the Rhode Island Locomotive Works, have just been received, and are to be used in hauling freight. These engines are very heavy, weighing over 41 tons each, having cylinders 18 by 24 in., and driving wheels 62 in. in diameter, and are in every respect strictly first class.

"The increasing demand for better wharfage facilities at East Boston has led the company to commence improvements there which are now well under way, and which will be, it is believed, completed during the coming summer. It is proposed to build out the wharf adjoining the Cunard wharf 30 feet into the stream, if legislative permission can be obtained, and extend it also at the other end, making it fully 500 feet long; dredge the channel on either side, and fit it completely for the largest ocean steamers. It will also be widened and a long shed built on it for the reception and storage of freight, and upon the removal of the repair shops additional tracks will be put down and every thing possible done to make the terminal facilities here among the best in Boston."

East River.—This company has been organized to build a railroad from a point on the proposed New River road in Mercer County, W. Va., up East River to its head in Tazewell County, Va. It is intended to reach an iron-ore district.

East Tennessee, Virginia & Georgia.—It is reported that a number of New York capitalists (including George I. Seney, C. S. Brice, E. H. R. Lyman, and others) have taken an interest in this company, and have agreed to take all the new stock not taken up by the present stockholders. The parties mentioned are the chief owners of the Lake Erie & Western road, although it is not probable that there is any connection between their two operations. It is understood that Col. E. W. Cole is to continue President of the company.

Elizabeth City & Norfolk.—Tracklaying on this road was completed last week at Shingle Landing Creek, about half-way between the two ends of the road. It will be formally opened for business May 25. The line extends from Berkley, opposite Norfolk, Va., on the Elizabeth River, nearly due south to Elizabeth City, N. C., on the Pasquotank River, and is 44 miles long. It runs through the belt of dry and fertile land just east of the Dismal Swamp, which is still very sparsely settled, although one of the first settled sections of the country. Elizabeth City is an old town and has some business with Norfolk which has hitherto been done by canal. An extension from Elizabeth City west by south to Edenton, about 30 miles, is to be built; work will be begun in June.

Fitchburg.—This company has reduced local fares out of Boston, and has increased the number of its local trains, with a view to building up and increasing its suburban business.

On the Vermont & Massachusetts Division this season a new track is to be built at Pequignot, about four miles of track on a new location between Baldwinville and Royalston, and a short section near Miller's Falls. These changes will shorten and straighten the road, and will dispense with eight bridges. This will leave only seven wooden bridges on this division, which are soon to be replaced with iron. The second track will be extended several miles.

Georgia.—The lease of this road has been finally signed, the security required having been deposited. It is executed to Wm. M. Wadley as sole lessee, though it is understood that the South Carolina Railroad Company may come in as joint lessee hereafter, when its reorganization is completed.

Grand Junction.—This road, which extends from West Huntington, Ont., to Peterboro, 56 miles, with a branch from Belleville to Madoc, has been purchased by the Grand Trunk Company. The chief object of this action is, it is supposed, to prevent the use of the road as part of the projected Ontario & Quebec line.

Illinois & Indiana.—This company has filed articles of incorporation in Indiana to build a narrow-gauge road from Bedford, Ind., east to the Ohio line. It will be an extension of the Springfield, Effingham & Southeastern road.

Indianapolis, Peru & Chicago.—It is reported that this company will build the proposed line from Plymouth, Ind., north to South Bend, about 20 miles, and will operate it as a branch.

Kent Northern.—At the annual meeting in Richibucto, N. B., last week, the board reported that the rails granted to the company by the Dominion government were ready for delivery. The board expects that the contractors will be able to begin work on the tracklaying very soon, and that the road will be finished this season.

Little River Valley & Arkansas.—This company has been reorganized and a new board elected, the majority of the directors representing the Texas & St. Louis Company, which now controls the road. It extends from the Mississippi at New Madrid, Mo., to Malden, 27 miles. It will be extended from New Madrid up the river to a point opposite Cairo, about 35 miles, and from Malden to the Arkansas line, and will form the Missouri section of the Texas & St. Louis Extension from Texarkana to Cairo.

Lookout Mountain.—At the annual meeting in Chattanooga last week, the stockholders voted that the contract with R. G. Huston & Co. for the construction of the road

from Chattanooga, Tenn., to Rome, Ga., had expired by limitation, the contractors having failed to begin work within the required time, and they authorized the directors to let a new contract for the building of the road as soon as possible.

Long Island.—The quarterly report of Receiver Austin Corbin is as follows:

| | |
|--------------------------------|--------------|
| Receipts from all sources..... | \$635,465.27 |
| Disbursements..... | 593,500.32 |

| | |
|--------------------------------|-------------|
| Balance on hand, March 31..... | \$41,964.95 |
|--------------------------------|-------------|

The report has been passed and approved by the Court.

Macon & Brunswick.—Proposals will be received for 40 days from May 5 for the grading and masonry of the first section of 20 miles of the extension from Macon, Ga., to Atlanta. Plans, profiles and specifications can be seen at the office of Resident Engineer James C. Long, in Macon, Ga. Other sections will be ready to let soon.

Manhattan.—An important suit has been begun in the New York Supreme Court by Hamilton Ward, Attorney-General of the state, to have the charter of this company annulled and a receiver appointed for its effects. The complaint charges that the company has violated its charter, is practically insolvent and has allowed its taxes to remain unpaid over a year. It is further alleged that the formation of a company without property, simply to hold a lease, is altogether outside of the law. The Court granted the usual order to show cause, returnable May 27.

Another suit has been begun by F. M. Weiler, a holder of New York Elevated bonds, to restrain this company from paying dividends on the stocks of the leased lines. It is charged that money is paid out in this way which really belongs to bondholders.

Marietta & Cincinnati.—A recent circular of Messrs. Hambleton & Co., of Baltimore, contains the following in reference to the recent advance in securities: "The trading in Marietta & Cincinnati bonds was on a very large scale—over \$1,000,000 bonds changing hands during the week. The large orders to buy Marietta & Cincinnati bonds came from New York, where there appears to be as great a desire to get in as there is a willingness on the part of some of our home holders of the bonds to get out. The question is daily asked, Why this sudden and great demand for Marietta & Cincinnati bonds? The answer is, speculation—nothing else. There is nothing new in the affairs of the Marietta & Cincinnati road, nor is there any immediate prospect of a reorganization of the company. Of course every day brings us nearer a reorganization of the road, which is bound to come sooner or later, but the question is what will the settlement be. The managers of the Baltimore & Ohio road are willing to settle if they can do so on their own terms. Their desire and intention is, we think, to get as low a rate of interest on the prior mortgage bonds as the bondholders will stand, so that the stock, which it is supposed they will agree to take for their fourth-mortgage bonds, will have some basis of value. There can be no doubt that the first and second-mortgage bonds of the Marietta & Cincinnati road are good. The only question is, Will the bondholders submit to a low rate of interest and take stock for past due coupons? This at present appears to be the programme. In the first place the stock is useless for voting purposes, because the third and fourth mortgage bonds vote, and besides, the Baltimore & Ohio Railroad own the entire fourth mortgage and can foreclose at any moment if they desire to do so. The bonded debt of the Marietta & Cincinnati road is in round numbers \$13,000,000, upon which there are coupons now in default \$3,500,000. The last official report of the Marietta & Cincinnati Company was for 14 months ending Dec. 31, 1880.

| | |
|---|--------------|
| Earnings over expenses..... | \$328,133.68 |
| Add extraordinary expenses, betterments, etc..... | 500,000.00 |

| | |
|-------------------------------------|--------------|
| Total estimated net earnings..... | \$828,133.68 |
| Rentals and guaranteed charges..... | 538,512.85 |

| | |
|-------------------------------------|--------------|
| Surplus for coupons, 14 months..... | \$289,620.83 |
|-------------------------------------|--------------|

"At present the fixed charges of the Marietta & Cincinnati road, including interest on \$13,000,000 bonds (to say nothing of the \$3,500,000 past-due coupons), rents, leases and taxes, are in round numbers \$1,500,000 per annum. We think the road can earn when all repairs are made (which are now nearly completed) over and above all running expenses, rails, leases, etc., \$500,000. This is, we think, a fair and liberal estimate."

Marietta & North Georgia.—A controlling interest in this road has been sold to Joseph Kinsey, of Cincinnati, and George R. Eager, of Boston. The road now extends from Marietta, Ga., to Canton, 23 miles, and is of 3 ft. gauge. The purchasers intend to change the road to 5 ft. gauge and to extend it to Murphy, N. C., 102 miles from Marietta. Some 40 miles are graded beyond Canton.

Mexican Railroads.—A recent dispatch from Mexico to the New York World says:

"The Boston Central Company has almost reached Tula; cars run within eight miles of that city. They will this week commence at Celaya, going east toward Queretaro. The line between Tampico and San Luis Potosi will also be commenced immediately.

"The road from Campeche to Calkini has been surveyed and operations will soon be commenced there.

"The Palmer-Sullivan Company are pressing forward rapidly. Eleven thousand five hundred and ninety-eight laborers are now employed between Mexico City and Toluca, 2,000 being on the Morelia Division. Fourteen kilometres of road have been completed between Morelia and Acambaro, and four kilometres between Morelia and Patzcuaro. The Chief Engineer, Mr. W. C. Wetherell, will take personal charge of all surveys and construction work south of and including Zacatecas and San Luis Potosi, reporting directly to Mr. James Sullivan.

"The Toluca Division, from Mexico City to Toluca, will be under the charge of Mr. Rudolph Weiser; that from Toluca to Acambaro, Salamanca and Celaya, under Civil Engineer George Porter; that from Celaya and Salamanca north (the Zacatecas Division) will be superintended by Civil Engineer R. P. McCormick. Civil Engineer A. M. Wellington will have charge of the Morelia Division, from Acambaro to Patzcuaro, or beyond and westward.

"Mr. H. N. Potts, civil engineer, is at the head of the Colima Division, from Manzanillo to Colima, north and west.

"The Principal Assistant Engineer, Mr. E. Miller, will take charge of all surveys and construction work north of San Luis Potosi, reporting to Mr. J. Sullivan in Mexico City and to Mr. A. C. Hunt in Laredo.

"The city has been startled by rumored speculation which may interest our countrymen. A combination, it is said, has been made here to purchase 36,331 original shares of the Vera Cruz & Mexican Railroad stock belonging to the Mexican government. The gentlemen forming this society or association are Senors Ramon Guzman, Camacho, Felix Cuevas, Antonio Mier, Obregon, of Guasajuata; Cardena y Cie; Mr. Thomas Braniff, of the Mexican Railway, and

Mr. Adams, of the house of Winslow, Lanier & Company, of New York.

"These gentlemen have purchased at £12 sterling and expect to sell in New York and London for £16 sterling; their agents have already received their instructions. I deem it my duty to warn Americans through the columns of the World to be cautious about purchasing this stock. In the first place, this company has never really been able to pay any dividends, notwithstanding it has had the privilege of charging enormous freights and has for many years—in fact ever since it was constructed—monopolized all the trade between Vera Cruz and Mexico City, owing to its having a capital account of \$38,000,000.

"Now, however, a radical change has taken place—a new era has dawned. A company has already been formed for the construction of a narrow-gauge railroad between the port of Vera Cruz and Mexico City via Jalapa, passing through a zone far richer than that of the present Vera Cruz and Mexican Company's road, climbing the mountain ridge to arrive at the table lands by 2 per cent. grades instead of 4, and it has a capital account which will not pass \$9,000,000. This line will be finished within two years and consequently will become a formidable rival to what is now termed the 'English Railroad Company,' absorbing all the freight or else forcing said company to reduce theirs to an equality with the new one. If, therefore, in the past they have never been able to pay real dividends on their overgrown stock, what are the probabilities of their doing so in the future? I repeat it would be well for our people, and our English cousins, too, to be careful."

Midland, of New Jersey.—The contract for the grading and masonry of the Paterson spur has been awarded to McKiernan & Bergen, of Paterson, the work to be done by August next. The price is said to be about \$35,000. The spur will be somewhat over a mile long, extending from a point near the present depot in Paterson to the business centre of the city. It will enable the road to secure a share of the traffic of Paterson, from which it is now shut out by the fact that its present station is on the outskirts of the city.

A second and final conference between the representatives of this company and coal operators of the Wyoming Valley was held in New York, May 18, and resulted in the breaking off of negotiations which had begun. When it was originally proposed to extend the Midland from Ogdensburg to Stroudsburg, Pa., the plan contemplated also the future extension of the road from Stroudsburg to Tamaqua, in the Schuylkill coal region. The coal operators of that section belong to the Construction Company of the Midland all the coal business on two tracts of land, one containing 10,000 and the other 18,000 acres. The operators of the Wyoming Valley were anxious to have the extension made from Stroudsburg to Scranton, instead of to Tamaqua, and it was with a view to inducing the Construction Company to make this change in the route that these conferences have been held. William S. Dunn, the President of the Construction Company, has presided at the meetings, and the discussion of the proposed change has been full and free. The operators who desired the extension to Scranton did not meet the terms of the Construction Company, however, and it was decided to extend the road to Tamaqua, as originally contemplated. The contract for the extension from Ogdensburg to Stroudsburg was let May 18 to Henry R. Low, formerly of Middletown, N. Y., and late of Pittsburgh, and it is expected that this section of the road, about 44 miles, will be in operation some time next fall. Surveyors are now in the field between Stroudsburg and Tamaqua, and this extension, about 45 miles long, will probably be completed by December of next year.

Missouri, Kansas & Texas.—On the Southeastern Extension of this road track is now laid 33 miles south by east from last year's terminus at Greenville, Tex., and will soon reach the crossing of the main line of the Texas & Pacific.

On the Southwestern Extension track is laid to Ft. Worth, Tex., 32 miles south by west from the late terminus at Denton, 68 miles from Whitesboro and 93 miles from Denison. This line from Whitesboro to Ft. Worth is owned and will be used jointly with the Texas & Pacific.

Missouri Pacific.—Work is progressing steadily on the extension of the Lexington & Southern Division from Nevada, Mo., south to Carthage. Track has been laid from Nevada south 30 miles, and is expected to reach Carthage by July.

St. Louis dispatches report that surveys have been ordered for a new line from Pacific Junction (37 miles west of St. Louis) west by south to Carthage, about 225 miles. The proposed line is parallel to the St. Louis and San Francisco road and north of it.

Morristown, Cumberland Gap & Ohio.—This company has been organized to build a railroad from Morristown, Tenn., on the East Tennessee, Virginia & Georgia road, northwest to Cumberland Gap, about 40 miles. Surveys for the road are to be made at once.

Nashville, Chattanooga & St. Louis.—This company makes the following statement for April and the ten months of its fiscal year from July 1 to April 30:

| | | |
|-----------------------------|--------------|----------------|
| | April. | Ten months. |
| Gross earnings..... | \$183,525.98 | \$1,784,988.60 |
| Expenses..... | 117,140.32 | 1,085,165.88 |
| Net earnings..... | \$70,385.46 | \$699,822.81 |
| Interest and taxes..... | 39,781.22 | 383,541.32 |
| Surplus..... | \$30,604.24 | \$306,281.49 |
| Improvements N. W. Div..... | \$149,693.25 | |
| New iron bridges..... | 25,516.00 | |
| Real estate..... | 20,462.35 | |
| New equipment..... | 174,140.10 | |
| | | 369,811.70 |

Excess of expenditures..... \$63,530.21

New equipment includes \$27,036.10 for new locomotives and \$147,104 for new freight cars for the road.

New Bonds.—New issues of bonds have been offered or marketed as follows:

The **Dayton & Michigan**, 5 per cent. consolidated loan, offered to replace maturing bonds, was taken in lots of various sizes at prices varying from 103½ to 105, and accrued interest.

The **Indiana, Bloomington & Western** offers through the Corbin Banking Company, of New York and Boston; Maxwell & Graves, of New York, and Matthews & Whittaker, of St. Louis, an issue of \$3,000,000 Eastern Division first-mortgage 6 per cent. bonds, having 40 years to run. They are offered at 102½ and interest. They are issued to build the extension from Indianapolis to Springfield, O., about 140 miles.

The **Elizabeth City & Norfolk** offers through Dominick & Dickerman, of New York, an issue of \$900,000 first-mortgage, 6 per cent., 40 year bonds, at 97½ and interest. The road is just finished from Norfolk, Va., to Elizabeth City, N. C., 44 miles, and is to be extended from Elizabeth City to Edenton, 30 miles further.

The **Elizabeth, Lexington & Big Sandy** offers, through Fisk & Hatch, of New York, its first-mortgage 6 per cent.

bonds, the total issue of which is \$3,500,000. They are offered at 102½ and interest. The road is the Chesapeake & Ohio extension to Louisville, and will be 135 miles long, 107½ miles of which are owned and 27½ leased. Of the line owned, 41½ miles are completed, and work on the rest is well advanced.

New Orleans Pacific.—Tracklaying is now in progress from Alexandria, La., in both directions, and also on the Shreveport end. On the southern end track has been laid from Donaldsonville, the end of the old New Orleans, Mobile & Texas (now owned by this company) northwest 15 miles to Plaquemine, 80 miles from New Orleans. Grading is nearly completed on the branch to Baton Rouge.

The company has bought property with an extensive water front on the New Orleans side of the river, whence transfer boats will run to the terminus at Westwego, on the west side of the Mississippi.

Northern Pacific.—Grading has been begun on the branch line which is to run from Fargo, Dak., southwest, and it is announced that 65 miles, from Fargo to Ft. Ransom, will be built this season.

Work has been resumed on the extension of the Castleton Branch northwest, and a considerable force is employed.

It is understood that negotiations are now in progress between the Billings and Villard parties for a withdrawal of all the injunction suits lately begun and an agreement as to the future management of the company. No final settlement has yet been reached, though a friendly agreement is said to be sure.

Oregon Railway & Navigation Co.—A recent circular from this company says that the work of construction, which was seriously interfered with during the winter months by the severe and protracted cold weather, was recommenced with full vigor last month. Trains are now running through from the Dalles to Walla Walla, 123 miles. The line from Walla Walla to Grange City, on Snake River, a distance of 58 miles, together with the Dayton Branch, 16 miles, is fully graded and ready for the ties and iron. Contracts for the lines north of the Snake River from Texas Ferry, opposite Grange City, to Colfax and Farmington, 90 miles, have been let, and grading has been commenced. The construction of the line from Umatilla to Baker City, about 160 miles, the point of connection with the proposed Oregon Branch of the Union Pacific, has also been commenced from various points. The work upon the line from Portland to the Dalles, 90 miles, was likewise begun some weeks since, and will be prosecuted night and day, so as to insure the completion of an unbroken rail line from Portland up the Columbia before the end of the year.

Peachbottom.—Counsel for bondholders of the Middle Division of this road have applied to the United States Circuit Court in Philadelphia for the appointment of a receiver. This division extends from York, Pa., to Delta, 35 miles, and has a bonded debt of \$323,600, upon which interest is in arrears. At a hearing on May 16, holders of the bonds of the Eastern Division (which extends from Oxford to Dorsey, 20 miles, and has a debt of \$127,800, on which interest has been regularly paid), appeared and asked to have that division exempted from the receivership. The Court adjourned the case for a few days, in order that an arrangement between the creditors might be made.

Petersburg.—At a meeting of the second-mortgage bondholders, held May 3, a plan for preventing the foreclosure sale was adopted. This plan was submitted by the pool committee, who have purchased all of the outstanding indebtedness subject to the second mortgage. This committee have also 7,645 shares of the capital stock. The scheme provides for the reorganization of the road without its sale, by the payment of all past due interest under the first, and by funding past due interest under the second mortgage bonds. This scheme was unanimously approved of by the bondholders. Application has been made to the United States Court to deliver possession of the road to the company, the claims of all creditors having been satisfied.

Philadelphia & Reading.—The report of the Special Master to the Court shows the following account for the Receivers for February:

| | | |
|-----------------------|----------------|-----------------|
| | Railroad Co. | Coal & Iron Co. |
| Balance, March 1..... | \$304,182.32 | \$52,067.27 |
| Total receipts..... | 2,393,729.33 | 1,069,700.80 |
| Total..... | \$2,697,911.65 | \$1,122,698.07 |
| Disbursements..... | 2,184,812.25 | 1,093,040.87 |
| Balance, April 1..... | \$513,099.40 | \$29,657.20 |

The Pennsylvania Supreme Court has heard arguments on the appeal from the Common Pleas in the matter of the decision on the election of the Bond board of directors, but no decision has been made.

Pittsburgh, Titusville & Buffalo.—It is stated that this company will extend the lately purchased New Castle & Franklin road to Pittsburgh. The line proposed is parallel with the Pittsburgh & Lake Erie road to the mouth of the Conoquenessing Creek, thence to Brush Run, and thence down Pine Run into Pittsburgh, crossing the Allegheny River near the water works and passing into Pittsburgh on an elevated road on the line of the furnaces. The terminus will be nearly opposite the Monongahela House in Pittsburgh.

Work has been begun on the extension of the main line from Brocton, N. Y., to Buffalo. This section will be used jointly by this company and the New York, Chicago & St. Louis.

Providence & Worcester.—On June 1 this company will reduce fares on its road to 2½ cents per mile for all distances over five miles. The through fare between Providence and Worcester will be \$1.10 instead of \$1.35 as heretofore.

Rochester & Pittsburgh.—This company has bought property at Charlotte, on Lake Ontario, just north of Rochester, for terminal and dock purposes. The road is to be extended from Rochester to Charlotte as soon as possible.

The company has also bought the Silver Lake road, which runs from Gainesville, N. Y., to Perry, eight miles. It has a considerable local traffic, and is expected to be a profitable feeder.

Roxboro.—This company has been organized to build a railroad from Roxboro, N. C., to the North Carolina Railroad, probably to Durham. The distance to that point is about 20 miles.

St. John Bridge & Railway Extension.—This company has now been fully organized to build a bridge of the St. John River in St. John, N. B., and the approaches, which will form a connecting line between the St. John & Maine and the Intercolonial roads. The board has representatives of the St. John & Maine, the European & North American and the Maine Central companies.

St. John & Maine.—Besides other improvements on its line, this company has lately secured two Pullman sleeping

cars, which will be run on the night trains between St. John and Bangor.

St. Louis & San Francisco.—Track is now laid on the Arkansas Division to Benton, Ark., 20 miles south by west from the late terminus at Seligman, Mo., and 50 miles from the junction with the main line at Plymouth. Trains run to the new terminus, and the fare from St. Louis has been fixed at \$13, the distance being 335 miles.

Shenandoah Valley.—This company has decided to build its own line all the way from Waynesboro to the Norfolk & Western road, and not to use any part of the Richmond & Allegheny track. This decision has been made, not because of any difference between the companies, but because this company desires to reach several promising iron mines, which are not touched by the track which it was proposed to use in common.

South Carolina.—The Charleston News and Courier says: "The decision rendered by the United States Supreme Court on Monday, clears away the last obstacle to the reorganization of the South Carolina Railroad Company, without prejudicing such claims as could not be settled without litigation. It is provided that, when the road is sold, a sufficient sum to cover the claim of the syndicate shall be paid into the registry of the Court to be held subject to the final determination of the case. In this way, the syndicate and their counsel are assured of receiving what is adjudged to be due, without locking up indefinitely the whole property, and keeping it for years in a condition of suspended animation. There will be some delay, of course, in making a final settlement with the syndicate through the courts, but the delay will no longer prejudice interests disconnected from the syndicate's outstanding demands, which alone prevented the pending appeal from being dismissed by consent.

"There is apparently no reason why the South Carolina Railroad should not now be promptly sold. Judge Bond is expected in Charleston with Chief Justice Waite this month, and what formal orders are necessary can then be made. Allowing 60 days' notice of sale, the property can be disposed of early in the autumn. The important point is that, when the sale of the road is once assured, the purchasing committee and others interested can go on with their arrangements without waiting for the actual sale. The work of building new steamers can be pushed forward, as can the extension of the railroad to the waterside.

"A desire has been expressed that the South Carolina Railroad should be reorganized, without being sold, in order that the privileges conferred by its charter might unquestionably be retained. But we are informed that it is the opinion of counsel that the purchasers at the sale under the order of the Circuit Court will enjoy all the rights, privileges and franchises which the corporation possessed prior to the sale. In any event it is doubtful whether a sale could be avoided, inasmuch as the South Carolina Railroad Company guaranteed certain obligations of the Greenville & Columbia Railroad Company and has other floating liabilities, which will be extinguished by a sale and could not be easily disposed of in any other manner. We should suppose, however, that persons having claims which will be extinguished by a sale would give a release for a trifling sum, if a sale were desired to be avoided. There is yet another consideration. It would require a sale we presume to enable the new purchasers to disembarass themselves of bondholders and stockholders for whom pillar liens will leave nothing at a sale, and who having failed to come into the agreement with the Purchasing Committee, have no interest in any new company to be formed by those whom the Purchasing Committee represent. The plans of the Committee, it is presumed, will be soon made known."

Texas & St. Louis.—The St. Louis Republican says: "A special meeting of the stockholders of the Texas & St. Louis Company will be held at Tyler, Tex., on July 27, to vote upon the proposition to increase the capital stock of the company to \$12,000,000. A majority of the shareholders at the annual meeting were in favor of this proposition, but under the law it is required that a special meeting shall be held for this purpose, and it seems to be a foregone conclusion that the stock will be increased to the amount stated. Colonel Paramore, the President of the company, has just returned from Texas. He says that among other business transacted at the annual meeting, the charter was amended, providing for the extension of the line from Waco to Laredo, in a southwesterly direction, with a branch also to Eagle Pass, on the Rio Grande River. This is quite an important point, and while it has not fully been determined to build the branch for some time to come, still those interested in the extension wish to be ready for any emergency. It is the intention of the owners of the Sunset route to extend their line to Eagle Pass, and when that is done the Texas & St. Louis will certainly build to that place, to make a valuable connection there. Track-laying on the narrow-gauge toward Waco is progressing rapidly. Three cargoes of iron have arrived at Galveston, and the material is being transported to the field of operation as speedily as possible. The work is going on at both ends, and orders have been given to put down the iron as fast as the grading will permit. A large force of men are at work from the Corsicana and Waco ends respectively, pushing on to the half-way place.

"In regard to the Arkansas Division, Col. Paramore says that there are now four corps of engineers in the field, two corps at work on the preliminary line, and the others engaged in locating. Within ten days or two weeks the first hundred miles from Cairo will be ready to let for contracts."

Texas Western.—The new owners of this road have filed amended articles of incorporation providing for the extension of the road from Houston, Tex., to Galveston.

The Labor Market.—A number of the Chicago, Burlington & Quincy trackmen have struck for an advance from \$1.10 to \$1.25 per day. This company has raised the wages of the mechanics in its shops about 10 per cent.

The Chicago & Alton has given the men in the shops and yards at Bloomington a small advance.

The strike of the yard and freight men at Chicago is practically at an end, a few of them having resumed work and the places of the rest being filled by new men.

The strike at the Grand Trunk shops in Montreal is also at an end, the men resuming work on the company's terms, which included an advance of wages somewhat less than that asked for by the men.

The New York, Lake Erie & Western brakemen have decided not to strike, the company having promised their demand for an increase of wages fair consideration.

The West Jersey Company has raised its trackmen's wages to \$1.25 per day.

Wyoming & Utah.—Surveys are in progress for this projected new line and a contract for grading the first section has been let. The projected line is from Corinne, Utah, on the Central Pacific, eastward by Blacksmith Fork and Box Elder Cañon to the coal fields on Bear River in Wyoming Territory. The new line is supposed to be in the interest of the Central Pacific.

ANNUAL REPORTS.

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Alabama Great Southern.

This company, an English organization, works the line formerly known as the Alabama & Chattanooga, from Chattanooga, Tenn., to Meridian, Miss., 290 miles. The following report for 1880 is published in London:

"The statements submitted give the gross earnings in 1880 as \$643,130, as compared with \$444,181 in 1879, showing an increase of \$198,949. The receipts per mile per annum for 1880 are thus \$2,180, as against \$1,500 for 1879. Considerable decrease is shown in the percentage of working expenses, which was 69.2 per cent. in 1880, as against 80.2 per cent. in 1879, and a further decrease is expected in 1881. The board has steadily pursued the policy indicated in former reports, of raising the service, of improving the road-bed, and of increasing the rolling stock and equipment, so as to enable the company the better to do the increasing business, both as regards passengers and freight.

"In the last report, dated May 20, 1880, reference was made to the then intention of the board to construct an independent line between Wauhatchie and Chattanooga, five miles. It has been decided not to carry out this intention, and an agreement has been concluded with the Nashville & Chattanooga Railway Company, securing for a period of 33 years, on terms satisfactory to both parties, the joint use of the existing line between Wauhatchie and Chattanooga.

"The accounts of the American corporation show a balance to the credit of net revenue of \$112,834, which includes the sum of \$32,231 brought forward Dec. 31, 1879. Out of this balance the sum of \$3,005 has to be provided to defray the current expenses of the English company from its formation to Dec. 31, 1880, leaving an amount of \$17,211 available for distribution, of which the sum of \$15,626 will be paid over to the English company for dividend, less income tax, upon the preference shares now held by that company, leaving a balance of \$1,584 to be carried forward to next year.

"The directors propose that the above sum of \$15,626 should be appropriated as follows:
Dividend at 6 per cent. on preference shares from the dates of their respective payments to July 31, 1878, after deducting income tax..... \$4,938
Dividend of 6 per cent. on preference shares for 14 months from July 31, 1878, to Sept. 30, 1879, after deducting income tax..... 10,687

Total..... \$15,626

Such dividend to be payable on May 1, 1881.
"On Dec. 31, 1879, the outstanding claims amounted to \$522,076. During the year 1880 the amount was reduced to \$293,282, of which a considerable portion is disputed and in suspense. The amount of the company's bonds, held in trust for the purpose of meeting these claims, is \$302,000.

"In accordance with the powers vested in them by the resolutions passed at an extraordinary general meeting held May 31, 1880, and duly confirmed, the directors now announce the issue of 19,340 6 per cent. A preference shares of £10 each."

Wilmington & Northern.

This company owns a line from Wilmington, Del., to Reading, Pa., 72 miles, with the French Creek Branch, 6 miles, and the Rockland Branch, 2 miles, making 80 miles in all. The two branches were completed last year. The following statements are from the report for 1880, presented at the recent yearly meeting.

The tonnage of freight carried was as follows: 1880, 335,339; 1879, 241,352; increase, 93,987 tons, or 39 per cent.

The earnings for the year were as follows:

| 1880. | 1879. | Increase. | P. c. |
|------------------------------------|--------------|-------------|-------|
| Passengers..... \$39,076.09 | | | |
| Freight..... 186,065.47 | | | |
| Mails, etc..... 6,485.90 | | | |
| Total..... \$231,627.46 | \$154,204.82 | \$77,422.64 | 50.3 |
| Expenses..... 202,301.10 | 148,380.25 | 53,920.85 | 36.4 |
| Net earnings..... \$29,326.36 | \$5,824.57 | \$23,501.79 | 403.5 |
| Gross earn. per mile..... 3,047.73 | 2,141.73 | 906.00 | 42.3 |
| Net earn. per mile..... 385.87 | 80.00 | 304.87 | 377.0 |
| Per cent of exps..... 37.31 | 96.35 | | |

During the year 600 tons of steel rails and 30,961 new ties were laid; bridges and trestles were repaired and 300 feet of trestle filled in. The road-bed was maintained and a new freight office built at Wilmington. There were 104 freight cars rebuilt.

Payments from net earnings were as follows:

| |
|--|
| Net earnings..... \$29,326.36 |
| Interest and redemption branch bonds..... \$3,227.77 |
| New engines, buildings, sidings, etc..... 14,024.91 |
| Cost of branches in excess of bonds sold..... 6,272.48 |
| Balance..... \$5,801.20 |

The French Creek Branch was completed at a cost of \$45,352.01, and the Rockland Branch at a cost of \$20,820.49. To this end the remaining \$30,000 of the French Creek mortgage bonds and the \$17,000 Rockland Branch bonds were sold at par and accrued interest. Under the agreement made with the purchaser of the bonds, a portion of the freight passing over the branches is payable in bonds, and in this way \$1,400 of the bonded indebtedness has been cleared

away. Both branches have been in operation since last summer, with satisfactory results.

At the adjourned stockholders' meeting, held on July 22, it was voted to increase the capital stock by 520 shares, for the adjustment of outstanding claims for land damages, amounting, with interest, to \$27,046.28. This new stock has been issued at par, in full settlement with the claimants and it is believed that every claim against the company is now adjusted. The report recommends the substitute at as early a date as possible of steel rails for the iron ones now in use; also the rebuilding of certain culverts, and filling of certain trestles. The repairs on the Schuylkill bridge will cost nearly \$4,000. Special attention is called to the inadequacy of the terminal facilities of the road in Reading.

Georgia Railroad & Banking Co.

This company owns a line from Augusta, Ga., to Atlanta, 171 miles, with branches from Camak to Macon, 80 miles; from Union Point to Athens, 39 miles, and from Barnet to Washington, 17 miles, making 307 miles in all. The report is for the year ending March 31, 1881.

The equipment consists of 41 engines; 31 passenger, 4 sleeping and 11 baggage and mail cars; 420 box, 107 Green Line box, 31 stock, 181 flat, 108 coal and 20 caboose cars; 25 service cars. During the year three mogul freight engines were bought and two light engines sold; 2 passenger, 2 sleeping, 38 box, 8 Green Line, 45 flat, 49 coal, 5 caboose and 3 service cars were added.

The general account is as follows:

| | |
|--------------------------------------|----------------|
| Stock..... | \$4,200,000.00 |
| Bonds..... | 2,327,000.00 |
| Unclaimed coupons and dividends..... | 43,622.38 |
| Profit and loss..... | 729,785.90 |
| Income account..... | 523,868.09 |

| | |
|---------------------------------------|----------------|
| Total..... | \$7,224,276.37 |
| Road and outfit..... | \$4,200,000.00 |
| Real estate and bank building..... | 62,065.03 |
| Stocks and bonds..... | 625,283.88 |
| Western, of Alabama, accounts..... | 883,374.76 |
| Macon & Augusta Branch..... | 782,887.26 |
| Pt. Royal & Augusta..... | 200,000.00 |
| Walton R. R..... | 42,510.93 |
| Steel rails, accounts, cash, etc..... | 901,361.25 |
| Fixed charges..... | 126,793.26 |
| Total..... | 7,224,276.37 |

In addition to the bonds given above, the company has \$296,000 Macon & Augusta bonds assumed, and is liable as guarantor and half owner on \$1,051,500 Western, of Alabama, bonds. The total bonded liability is thus \$3,674,500, an increase of \$746,000 during the year. Since April 1, 1877, there has been a net decrease of \$309,586.79 in bonded liabilities.

The earnings for the year were as follows:

| | 1880-81. | 1879-80. | Increase. | P. c. |
|--------------|----------------|--------------|--------------|-------|
| Freight..... | \$1,032,750.75 | \$882,038.42 | \$150,712.33 | 17.1 |
| Passage..... | 305,022.03 | 255,443.91 | 49,578.12 | 19.4 |
| Mails..... | 32,191.64 | 32,041.81 | 149.83 | 4.7 |

Total..... \$1,369,964.42 \$1,169,524.14 \$200,440.28 17.2

Expenses..... \$55,442.51 \$66,448.93 \$11,006.42 24.7

Net earnings..... \$414,521.91 \$403,075.21 \$11,446.70 2.8

Gross earn. per mile..... 4,402.43 3,809.50 592.93 17.2

Net earn. per mile..... 1,350.23 1,313.00 37.23 2.8

Per cent. of exps..... 69.74 65.50 4.24

The increase in expenses was due to damage by floods, to increased train-service required, to a reduction in freight rates and to large expenditures on buildings and on new equipment.

The statement of income in the President's report is as follows:

| | |
|--|--------------|
| Net earnings of road..... | \$414,521.91 |
| of bank..... | 41,827.39 |
| Dividends, Atlanta & West Pt. stock..... | 32,000.00 |
| Rome R. R..... | 8,936.25 |
| Western R. R., rent of equip. and coupon acct..... | 161,000.00 |
| Miscellaneous..... | 8,482.54 |
| Total..... | \$666,868.09 |

Interest on bonds..... \$130,405.00

Dividends, 7 per cent..... 294,000.00

Interest, Western R. R. bonds..... 85,080.00

Legal expenses, etc..... 17,528.26

Total..... \$527,013.26

Surplus for the year..... \$139,854.83

The amount received from the Western road was \$75,920 in excess of the interest payments for that road.

The bonded debt of the Georgia road was increased \$746,000, but of this amount there is still \$600,000 on hand to pay bonds maturing in July next and for steel rails.

The road was damaged badly by floods, requiring heavy repairs. The Ocmulgee bridge on the Macon & Augusta Branch was washed away and has not been replaced, trains using the Central track into Macon, and this arrangement may probably be made permanent.

There were 2,768 tons steel rails used and 186,090 cross-ties. Some new depots and water-stations have been built, and new section-houses all along the line.

Under agreement this company has furnished ties and rails to the Walton Railroad, a branch 10 miles long, from Social Circle to Walton, and has also loaned that company an engine and cars. These advances are a first lien on the road.

The usual dividend on Atlanta & West Point stock was received, but the Rome dividend was reduced by heavy damage done that road by floods.

Traffic reported was as follows:

| | 1880-81. | 1879-80. | 1878-79. |
|----------------------------|------------|------------|-----------|
| Train miles..... | 1,137,158 | 1,017,797 | 1,019,478 |
| Bales cotton carried..... | 295,849 | 229,396 | 267,552 |
| Bushels grain..... | 2,434,460 | 1,040,074 | 1,061,305 |
| Barrels flour..... | 242,471 | 88,103 | 115,984 |
| Tons fertilizers..... | 58,277 | 41,408 | 28,109 |
| Total tons freight..... | 378,505 | | |
| Ton-miles..... | 49,961,044 | 37,085,356 | |
| Rate per ton per mile..... | 2.13 cts. | 2.46 cts. | |

The President's report says:

"The average rate for carrying freight was 2.13 cents per ton per mile, and for the previous year 2.46 cents. This is due principally to a reduction in rates by the Commission, and partly to the low rates at which competition forced us to haul through freight. The direction has submitted to the Commission, neither for the reason that the Commission has not injured us, nor because the company had no alternative but to submit, but because it was believed that reflection, observation and experience would soon convince the Legislature and the people that it was a mistake to attempt to authorize such great interference with railroad property, and that important modifications of the law might be hoped for at an early day. The direction believe that certain irrevocable provisions of our charter in reference to freight and passenger tariff can be invoked for our protection whenever the mandates of the Commission become intolerable. Notwithstanding the reduction in rates, the prospects of the company are encouraging. The business is constantly increasing, and with the completion of the improvements now in progress, expenses will be materially lessened."

As already stated in our columns, the road has, since the close of the year, been leased to Mr. Wm. M. Wadley at a fixed rental sufficient to pay all charges, and at least 10 per cent. on the stock. The lessee represents a combination including the Central, of Georgia, and South Carolina roads.